Entomologist's Gazette

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ENTOMOLOGIST'S GAZETTE

July, 1955 Vol. 6, No. 3

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Indexer, R. D. Weal.

All communications to the Editor, 22, Harlington Road East, Feltham, Middlesex, England. Telephone Feltham 3740

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NEWS AND VIEWS

The Nature Conservancy has done many services for Entomology in its preservation of interesting sites and has shown remarkable good sense in its attitude towards collecting in the preserved areas. We should like to see more co-operation from the entomological public who are asked to help The Nature Conservancy by submitting an account of insects observed when a Reserve is visited—we are told that this request is frequently ignored!

We have several times expressed approbation of the policy adopted at **Woodwalton Fen**, which is one of the Reserves most interesting to entomologists. The fauna of the fen is by no means well known. Just as we go to press we hear that the **Advisory Committee** of Woodwalton Fen has prohibited the use of Light Traps, or light producing apparatus which requires a car engine as a power source, and traps which destroy the total insect catch.

Here are two proposals and the latter has our entire support. The prevention of overcollecting or wanton destruction of insects is

obviously a valuable service to the mass of decent-minded and reasonable persons who make up the bulk of those interested in entomology.

The reason given for the ban on '*Light sources which require a car engine as a power source*' is '*because of the fire risk from car exhaust pipes*'; this reason makes it clear that the ban would undoubtedly include the small portable generators normally used by operators of Mercury Vapour apparatus.

Are we seriously expected to believe that fire risk is the real reason for this ban? Who advised the Committee on this danger? Any field entomologist with experience of both old and new methods of producing light could have pointed out that the danger of fire from a paraffin or petrol vapour lamp is infinitely greater than that from the exhaust pipe of an engine. In fact, has anyone ever heard of a fire being started in the country by the exhaust of a stationary engine?

The ban on engines is virtually a ban on the use of Mercury Vapour Light, and the banning of the best tool we have to tell us the nocturnal flying insect fauna of the Fen is, in our view, a backward step.

Why preserve an area because of its interesting fauna and flora if steps are to be taken to prevent the use of the most reliable means of telling us what that fauna is?

Can one imagine the attitude of the giants of the past to this present threat? Doubleday, Stainton, Stephens, Newman, Barrett and Tutt would turn in their graves. It is just as sensible to take this step today as to prevent the use of the 'new-fangled' ring or kite-nets in the days of Moses Harris, or of the new 'threat' of sugaring in Doubleday's time.

We are as interested as any individual or organization in the preservation of our threatened fauna and would gladly support any sensible scheme or schemes designed for that purpose—but it serves no useful purpose to make regulations which can only bring ridicule and discredit on our cause.

The South London Entomological and Natural History Society has for long been without a permanent home and in recent months has been labouring under the additional disadvantage of having its library and collections dispersed in the homes of various members.

We are glad to report that the Society has now found a home at 14 Rochester Row, Westminster, S.W.1, where it will be able to hold its meetings and house again the Library and Collections.

The meetings, which in recent years have been held on Wednesdays, will now be held on the Second and Fourth Thursday in the month: this meeting day is a reversion to an older custom. Visitors are always welcome at the meetings of the 'South London'.

We take this opportunity of wishing the Society well in its new home and hope that the fact of having its reference books and collections together again for the use of its members will lead to an increase in membership.

LETTERS TO THE EDITOR

HYSTEROTELY IN LEPIDOPTEROUS PUPAE

Dear Sir,

Mr. Haggett's figure (1954, *Ent. Gaz.* **5**: 222) reminds me of the pupae referred to in my note, under the heading 'An unusual result of parasitisation' (1945, *Entom.* **78**: 16).

These examples could not, in my opinion, be properly referred to hysterotely, as they appeared to have been the mechanical result of parasitisation. The species involved, the Indian Bombycid *Andraca bipunctata* Wlk., has a very large larva compared with the pupa, and the fact that the larval body space was occupied by a large Tachinid larva prevented the contents of the larval prolegs being retracted into the abdomen immediately prior to pupation, with the result that the pupa bore small chitinised tubercules in their place.

I have since come across a similar case. In this instance the species involved was the African Saturniid *Bunaeopsis jeffereyi* Beauv., and the pupae, all of which died, were each found to contain an enormous Dipterous pupa that entirely filled the abdomen and thorax.

I have had more than one pupa of various African Saturniids in which the larval scoli have persisted in the pupa as very short chitinised tubercules, and I also had a pupa of *Herse convolvuli* L., in India which had a small chitinised tubercule replacing the old larval horn.

Were the prolegs of Mr. Haggett's pupa chitinised or fleshy?

D. G. SEVASTOPULO, F.R.E.S.
Kampala, Uganda.
22/1/1955.

Dear Sir,

In the October, 1954, issue of the *Gazette* (Vol. **5**, p. 218) under the note on *Actinotia polyodon* Clerk, there is an unfortunate omission of my name. As there are far fewer records of this insect during 1954 than I anticipated, the record may be more important than I at first imagined, and I would be grateful if you would rectify the error.

G. HAGGETT.
1 Torton Hill,
Arundel, Sussex.

Dear Sir,

I have been intending for some time to write to correct an error in my article of April, 1954 (*Ent. Gaz.* **5**: 105-108), page 107, lines 14 and 22. This should not have read '*Gnophos obscurata*', but '*myrtillata* (Thunb.) (The Scotch Annulet).' I should be glad if readers would make the necessary correction.

L. E. SAVAGE.
65 Cranmer Avenue,
Hove 4, Sussex.

THE IRISH SUB-SPECIES OF *ALUCITA ICTERODACTYLA* MANN (LEP: PTEROPHORIDAE)

By H. C. HUGGINS, F.R.E.S.

In 1952 the B.M. expedition to the Burren of Co. Clare, Ireland, discovered *Alucita icterodactyla* for the first time in the British Isles near Ballyvaughan. These specimens, 14 in all, were taken from 20th July onwards and were not in fresh condition.

Acting on information given me by Mr. Bradley and Mr. Classey I visited the Burren in July, 1953, and took seven specimens. Of these, six were taken at the nearest points of the Burren to Lisdoonvarna on the coastal road, and were all in poor condition, though taken between 10th and 20th July; the seventh, a magnificent fresh female, was taken sitting on a grass-stem at midnight on 31st July, near Ballyvaughan. I ignored this one as Irish insects have usually a long emergence period, and in making future plans decided in 1954 to go earlier to try to get the moth in fresh condition, so arrived at the Burren on 30th June. The season was an exceedingly late one for insects, the early June insects were still on the wing, *Cupido minimus* Fuessly, and *Erynnis tages* L., were abundant, some in fresh condition, and *Zygaena purpuralis* Brün., was still emerging, whilst when I left on 28th July *Aspitates gilvaria* ssp. *burrenensis* Cockayne, was only just beginning to emerge and *Calamia tridens* Hüfnagel (= *virens* L.), had not yet put in an appearance, both of which had been fully out at the same time in the previous year. The late season was, however, all to the good as regards *icterodactyla.* On 1st July I found it just beginning to emerge, and for the next fortnight it was by no means uncommon in its particular haunts, so that in a normal year I should put its emergence date as beginning about 20th June.

The moth does not seem to like the patches of grass and flowers of some considerable extent which exist in the lowest part of the Burren, but prefers the narrow strips of straggling grass, wild thyme, etc., interspersed with stunted bushes of hazel and bramble, which are found between the cliffs about 200 feet above the coastal road. All my specimens were taken in the day-time, when it may easily be disturbed at any time after 11 a.m., G.M.T., and after 1 a.m. it may be seen sitting about, usually on shrubs and bushes a foot or so from the ground, having apparently climbed up these. It also sometimes indulges in short natural flights at this time. Its habits differ considerably from those of its near relative *tridactyla* L.—which usually, when disturbed, flits low over the grass and alights on another stem. *Icterodactyla,* when disturbed, has a disconcerting habit of often going nearly straight into the air to a height of from five to ten feet and

then frequently settles on the top of a bush or the face of a rock at a good distance from the ground. If, as often, there is a strong wind blowing, it is apt to be blown clean away, so it is not always easy to catch. I saw in all a large number of specimens and brought home about 30. Directly I began to assemble a good number in perfect condition I was struck by the difference between these Irish insects and the continental specimens from Corsica, Spain, etc., in the British Museum, shown me by Mr. Tams, and, since my return and through the kindness of Mr. Bradley, I have examined these again. In my long Burren series I have not a single male corresponding to the continental ones, and the female is usually of the same type. There is, however, a rather scarce female aberration in Ireland which approaches the continental insect. The Irish *icterodactyla* is much more like *tridactyla* than the continental insect, hence no doubt its non-recognition in the past. I have found *icterodactyla* much commoner than *tridactyla* in the Burren, and have no doubt that Kane and others saw it in the past but mistook it for the better-known species, of which there are several Burren records. This would hardly have occurred with the continental form, whose very pale sulphur-white and light grey fore-wings are exceedingly distinct.

Although there is a considerable range of variation in the Burren *icterodactyla*, except in the case of the female aberration already mentioned, it in no degree corresponds with the continental moth, and even in this aberration the cilia are much darker than in the nominotypical form. This constant difference appears to me to warrant the separation of the Irish insect as a sub-species, of which I append a description.

Alucita icterodactyla Mann. ssp. **phillipsi** *nov. sub-species*

Fore-wings pale ochreous-yellow, with contrasting greyish-brown cilia. Hind-wings pale ochreous-white, with greyish-brown cilia. Thorax and abdomen pale ochre. Sexes similar.
Holotype ♂, 'Burren, 1.7.1954, H. C. Huggins.'
Allotype ♀, 'Burren, 14.7.1954, H. C. Huggins.'

I am presenting this pair to the British Museum (Natural History).

Although the Burren specimens when fresh exhibit little or no variation in the colour of the cilia, which are in all cases darker than any continental ones I have seen, the fore-wings in the male have a considerable range of variation. The ground colour never approaches that of the continental, being ocreous in tinge in contrast to the clear lemon-white, but they are frequently darkened with fuscous scales, one specimen in my cabinet indeed approaches the colour of *Oidaematophorus tephradactylus Treits.* These darkened specimens are rather difficult to determine, especially the intermediate ones (the very dark ones are like nothing else I have seen), and Mr. Bradley kindly dissected one to make certain it really was *icterodactyla.*

The female aberration I have mentioned is in ground colour very like the continental moth, but paler; even so it retains the darker cilia of the Irish insect. Mr. Tams last year dissected one of these to confirm the identity.

Caradja, 1920 (*Iris;* **34**: 83) has described an ab. *noctis* of *icterodactyla* from La Grâve. This he describes as a dark grey infuscated form, which he calls a 'striking melanistic'. It would appear to me much darker than my darkest Irish insect, but I do not consider that the latter merits description as an aberration, being simply one extreme in a range.

As we have of recent years had a good number of 'burrenensis, hibernica, clarensis' and such Irish descriptive names, I have named this insect after my late friend, R. A. Phillips, of Cork, who first introduced me to the Burren and Aran Islands forty years ago.

Phillips was one of the best field naturalists Ireland has produced. He was primarily a botanist and conchologist, but entomologists will probably recall him as the first recorder of Irish *Argynnis euphrosyne* L., and the last of Irish *Thecla betulae* L.

I have to thank Mr. W. H. T. Tams and Mr. J. D. Bradley for dissections and assistance at the Brit. Mus. (Nat. Hist.), and Mr. Bradley for a translation of Caradja's record.

REFERENCES

BRADLEY, J. D., 1953, Microlepidoptera collected in the Burren, Co. Clare, Ireland, in 1952, including a Plume Moth new to the British list. *Ent. Gaz.*, **4**: 135-140.

THE ENGLISH NAME OF *MARGARONIA UNIONALIS* HUBN., (LEP: PYRALIDAE)

Why should the English name for *M. unionalis* be 'Scarce *Olive-tree* Pearl'?

The food of the larva, both in India and Africa, seems to be Jasmine invariably.

I wonder how many entomologists realize that Jasmine and the Olive are fairly close relatives botanically!

D. G. SEVASTOPULO.

Kampala,
Uganda

A KEY TO THE NYMPHS OF THE BRITISH SPECIES OF THE FAMILY CAENIDAE (EPHEM.)

By T. T. MACAN

There are now six species in this family recorded from Britain:

Brachycercus harrisella Curtis, 1834
Caenis macrura Stephens, 1836
C. moesta Bengtsson, 1917
C. robusta Eaton, 1884
C. horaria (Linnaeus), 1758
C. rivulorom Eaton, 1884.

C. robusta was found for the first time in 1951 (Kimmins 1954), *C. moesta* ten years earlier (Kimmins 1943).

Differences between the nymphs of *C. horaria, C. moesta* and *C. rivulorum* are described by Kimmins (1943); Schoenemund's (1930) key includes the first two but not the last of these three and *C. macrura* as well. The drawings of the pronota by these two authors are somewhat strikingly dissimilar and therefore, all being taken into consideration, there seemed good grounds for a fresh taxonomic study of the nymphs of this family as soon as material of all the species was available.

The basis of any such study is clearly a set of cast nymphal skins and the male adults that emerged from them, since only in this way can the identity be established with certainty. These cast skins were examined for characters of shape and pattern with a low-power stereoscopic microscope, and some were then dissected and mounted for examination under higher magnification. When differences between these skins of known identity had been established, whole nymphs were examined to ascertain how far characters that could be seen without dissection and mounting were reliable.

It soon became clear that the shape of certain parts varied a good deal according to the angle from which they were viewed; such differences as those noted between the drawings of Kimmins and Schoenemund might well be due to slight differences in method of dissection before mounting. Accordingly it was decided to draw a complete nymph of each species since the exact way in which any given part was lying could then be seen much more clearly than if it were drawn isolated. There is always the problem when drawings of this kind are being made of deciding whether to draw exactly what is seen, or whether to produce a series of perfectly symmetrical drawings each exactly like the others except in those features on which the species can be distinguished. The latter is more impressive, the former more accurate. The first alternative was chosen. The result is that some of the species appear to have heads of different shape, but this is because the heads are at a different angle; it was of course necessary to kill the nymphs before drawing them. Every effort was made, however, to arrange the nymphs so that pronotum and mesonotum of

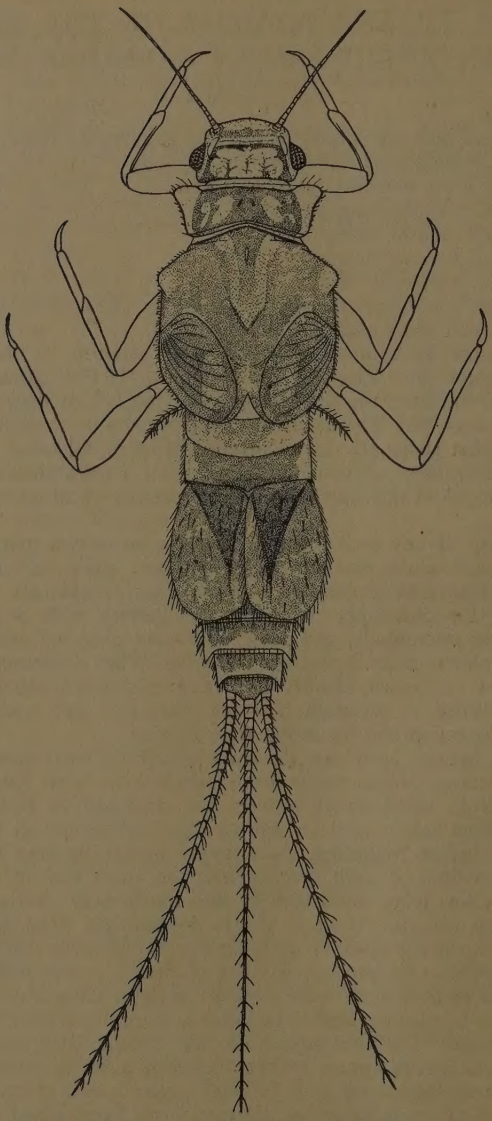

Fig. 1. *Caenis horaria*, 10 mm long, including cerci.

each one were in a similar position. The gill covers (which are the second gills) are slightly foreshortened from side to side in most of the pictures, which however do show the slight differences that characterize each species.

Caenis horaria

Material: L. Aigeil NS 3 cast skins; Windermere WL 2 cast skins; Esthwaite Water WL 9 cast skins and 7 whole nymphs; Wise Een Tarn WL 1 cast skin and 2 whole nymphs; L. Sheelin CV 3 cast skins.

The pronotum is produced into lateral points a feature which, though the exact shape varies, distinguishes this species at once from all others but *C. robusta.* The central area is darker than the sides and in this dark area there are lighter marks as in fig. 1, but often the contrast between the two is very slight.

The hairs on the wings are longer and more numerous than in any other species except *C. robusta.*

The second gills are somewhat round. On the underside, parallel with the outer margin and gradually converging to meet the distal margin at the inner corner, is a band of scales each of which is shaped rather like a cockade. They cannot be seen except on a mounted specimen and are so tiny that a 1/6th inch objective is needed to examine them, but they stand out quite clearly if these conditions are fulfilled and provide one of the easiest and most certain of the diagnostic features of this species. In each row of the band, that is at right angles to the margin of the gill, there are 2, 3, or 4 cockades. Usually 3 is the commonest number but occasionally there are 2 or 4 in most of the rows. (fig. 2.)

The sides of the last few abdominal segments seen from above are flatter than those of other species and have longer points. The pattern on them is often difficult to make out, but generally the segments are uniformly dark except for a light strip distally. Sometimes this light strip is prolonged forwards along the middle line and then the pattern is rather like that of *C. moesta.*

The fore femora are relatively thin with an evenly curving outline. A characteristic feature is the line of fine spines that runs transversely across them about a quarter of the way from the tip. These spines, which may conveniently be referred to as the paling spines since they resemble a paling on *C. moesta,* fall into an upper and a lower group, those terms being applied to a leg in the position shown in fig. 2. There are 3-5 spines in the lower group.

The margin of the tibia is beset with rather long sharp spines generally set close together, though the actual number varies a good deal and ranges from 11 to double that number or more. Inside them there is a row of slightly finer spines. The tarsus bears marginal spines similar both in shape and number to those along the tibial margin. When they are numerous, they are generally in two irregular rows, and, when few, in one row. The mid and hind legs are similar except

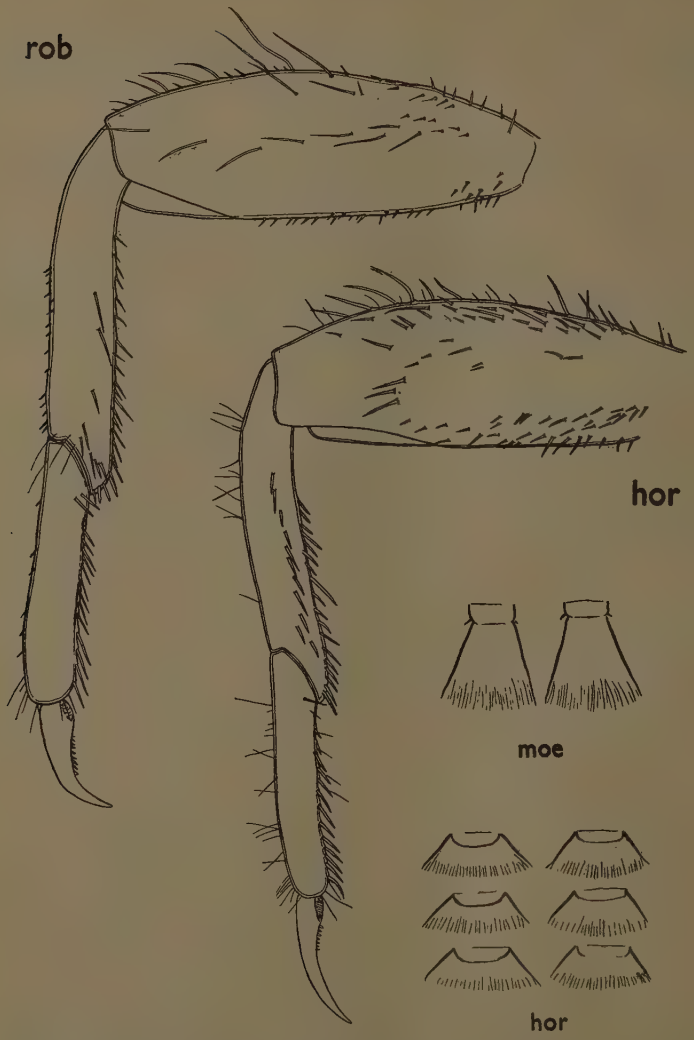

Fig. 2. Front legs of *robusta* (rob) and *horaria* (hor). The femur of *robusta* is 1.1 mm long. Free-hand sketch of cockade-like scales on wing covers of *moesta* (moe) and *horaria* (hor). A scale of moesta is a little over 0.01 mm long.

that the femora bear no paling spines, and the tarsi generally have two rows of marginal spines, with the distal ones of the inner row obviously pinnate. Some of the other spines are finely frayed but this character is not easy to make out unless the spine is seen from just the right angle, and they are not nearly as conspicuous as the pinnate spines.

Though some show little pattern, in general the legs of *C. horaria* are marked more conspicuously than those of other species. There are black bands near the tip of the femora and in the middle of the tibiae and tarsi. The bands on these last two segments may extend almost from one end to the other or may cover only about a third of the length.

The claws are notably long and slender.

Length. Males are 4.5-5 mm long and females up to 6 mm long, from front of head to tip of abdomen.

Ecological notes. All the present records are from still water, but Schoenemund (1930) records this species from rivers too. It is an inhabitant of soft mud and, in the Lake District, it was abundant not only in the rich black mud of Esthwaite Water but also in the peaty substratum of Three Dubs Tarn (Macan 1949).

Caenis robusta

Material: Wheatfen Broad EN 9 cast skins and 5 whole nymphs; Ranworth Broad EN 1 whole nymph; Scoulton Mere WN 1 whole nymph.

This species (fig. 3) is one of the most distinct of all. The diagnostic features of a whole nymph are:

1. Large size; full-grown specimens may be as much as 9 mm long from front of head to tip of abdomen, and are considerably bigger than any other British member of the genus.

2. Shape of the pronotum. The fact that there is a point at all on the side of the pronotum immediately distinguishes this species from all but *C. horaria* and the precise shape of the point serves to separate it from that one too. In *C. horaria* the side of the pronotum tends to start diverging outwards near the middle and the front curves down to meet it (fig. 1). The side of the pronotum of *C. robusta* does not start to diverge outwards till near the front and the fore margin runs straight (fig. 3).

3. The pattern. The light central line on head, pronotum, and mesonotum, the dots on the mesonotum, and the arrangement of dark bands on the legs are all peculiar.

C. robusta resembles *C. horaria* in its rounded gill covers and slim fore femora. The abdominal segments are produced into shorter spines.

Higher magnification of a dissected specimen reveals several more distinguishing characters:

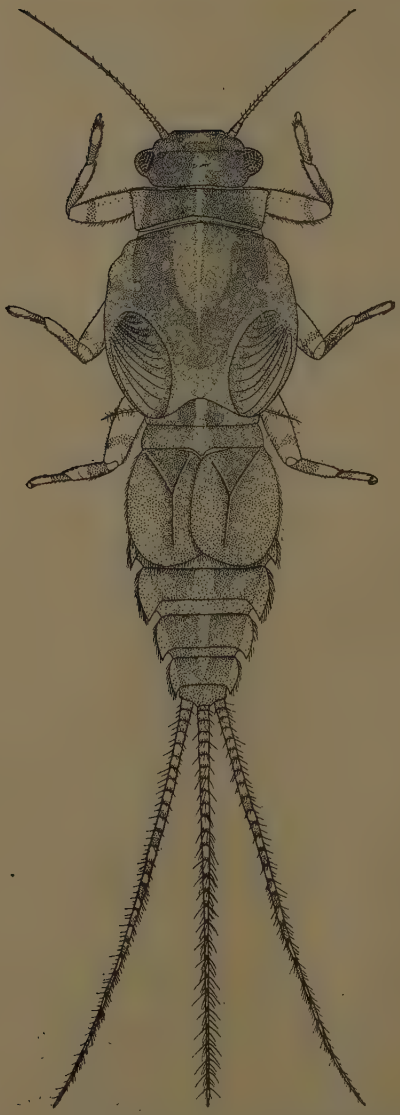

Fig. 3. *Caenis robusta,* 15 mm long, including cerci.

1. There is no transverse row of spines on the fore femur; about six long spines are set in line longitudinally down the segment (fig. 2).
2. There are six to eight cockade scales in each row.
3. The spines on the tibiae and tarsi are more numerous than on other species and the claws are bent in a characteristic way (fig. 2).

Ecological notes: This species has been found only in the Norfolk Broads and in Scoulton Mere which is not far away from them.

Caenis moesta

Material: Whitefield Loch WT 2 cast skins 1 whole nymph; Lough Veagh ED 1 cast skin; Lough Sheelin CV 1 cast skin; Wise Een Tarn WL 12 cast skins and 3 whole nymphs; River Dee at Llangollen DB 2 cast skins and 1 whole nymph; R. Wye BR 1 cast skin; R. Nene at Oundle NO 4 whole nymphs.

There are two characters of a whole nymph that separate this species from the two preceding. The first is the shape of the pronotum, which has no angles projecting sideways and is a little broader in front than behind (fig. 4). The second is the shape of the forelegs, which are broad, almost clubbed at the distal end, and often somewhat sinuate in outline (fig. 5). Pattern is generally not very clearly marked and of limited value in the provision of diagnostic characters. The pronotum has light edges and lighter markings within the dark central area, sometimes as shown in fig. 4 but more often with a larger comma-shaped mark near the centre and little other pattern. The abdominal segments may be marked as in the figure but more frequently the central light line flares distally. The leg markings are usually ill-defined but, when they can be made out, they are similar to those of *C. horaria.* The wing covers are rather more quadrate than in the two preceding species.

Examination of a dissected specimen under higher power reveals other differences. First there is only one cockade in each row of the line of scales on the gill-covers (fig. 2). The other important difference is that the paling spines are closer together, in a more regular line and more numerous, there being 6 to 8 in the lower group (fig. 5). They have a characteristic shape, being robust, broader at the tip than at the base, cut off straight at the top, and bifid. Under high power it is seen that they are finely frayed.

Other noteworthy features of a dissected specimen are as follows. There is a group of 5-14 spines on the forward projections of the pronotum, and most of them are on the edge of the plate. There are fewer spines along the tibiae and tarsi of all legs than in the preceding species and they are shorter (fig. 5). Exact numbers are discussed under *C. macrura,* which is described next.

Length: Male nymphs range from 4.5-5.5 mm, females from 5.5–6.5.

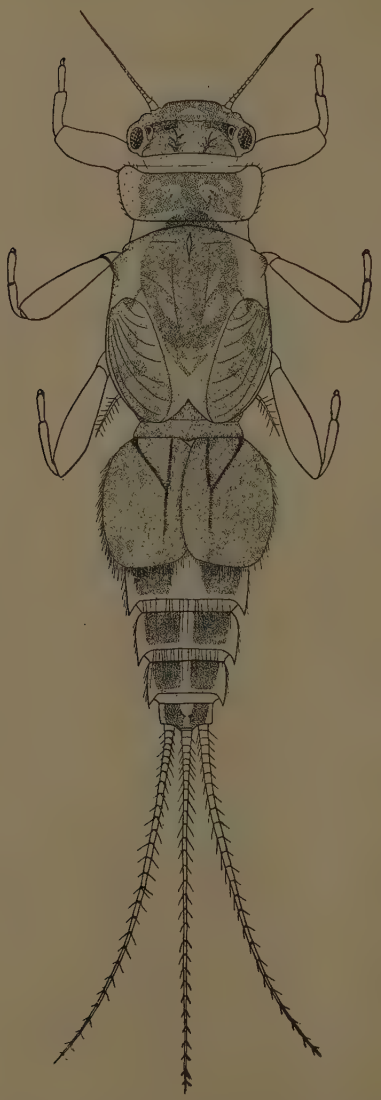

Fig. 4. *Caenis moesta,* 8 mm long, including cerci.

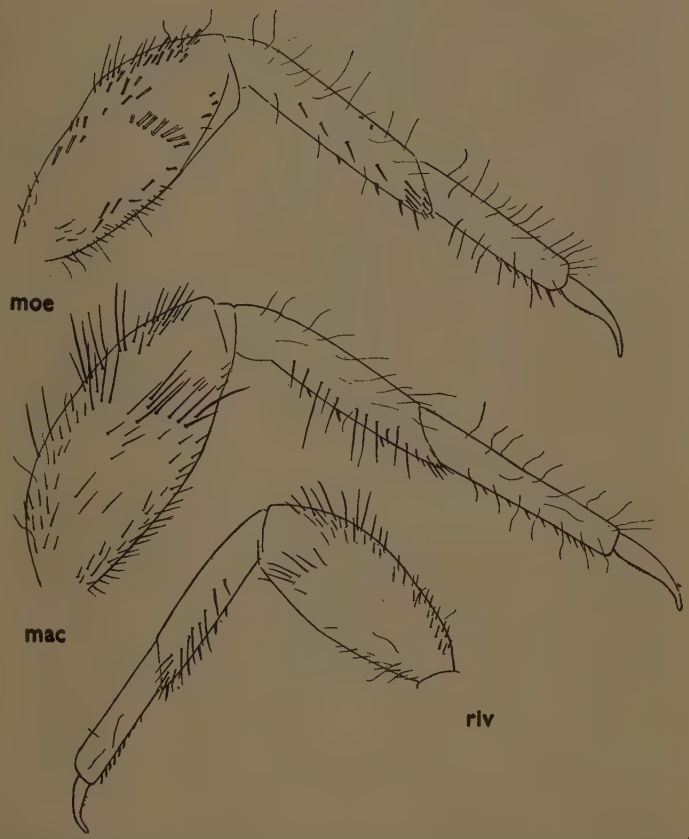

Fig. 5. Front legs of *moesta* (moe), *macrura* (mac) and *rivulorum* (riv). The femur of *moesta* is 0.75 mm long, that of *rivulorum* 0.45 mm long.

Ecological notes: Generally on a substratum of gravel or of large stones with fine material between them, in rivers, lakes and ponds.

Caenis macrura

Material: River Clyde at Hyndford Bridge LA 10 cast skins and 8 whole nymphs; River Cart LA 5 cast skins and 1 whole nymph; River Wye BR 4 cast skins and 2 whole nymphs.

Caenis macrura is very like *C. moesta* and may be distinguished from *C. horaria* and *C. robusta* in the same way as that species. The main problem is to separate the two. Generally whole nymphs can be distinguished on the shape of the pronotum, which has parallel sides in *C. macrura* (fig. 6). A few specimens, however, have pronota which are slightly broader in front than behind and these can easily be confused with *C. moesta,* in which the difference in width of back and front is not always as great as shown in fig. 4. Pattern does not provide any certain criteria though it is not completely valueless. Generally there is less contrast between light and dark than on *C. moesta* but, when this is not so, the markings of the pronotum may be very much as in that species. On the abdomen, however, there is a difference, which, though not completely reliable, will serve to distinguish many specimens. Whereas on *C. moesta* the central light line tends to flare distally, on *C. macrura* it tends to flare proximally so that it is the inner part of the segment that has a triangular or often, as on the one but last segment in fig. 6, a round light mark.

The most clear-cut difference between the two is provided by the spines on the legs, though unfortunately it is sometimes difficult to make out the features on a specimen that has not been cleaned and mounted. The paling spines of *C. macrura* are more slender, longer, less regularly aligned and generally more numerous than those of *C. moesta,* there being 8-11 in the lower group (fig. 5). Under low power (x 120) all appear to be simple pointed spines but under high magnification (x 480) it is seen that some are finely frayed and bifid at the tip. The numbers of spines along the margins of the legs of the two species are as follows:—

	Fore tibia	Fore tarsus	Mid tibia	Mid tarsus	Hind tibia	Hind tarsus	Number of legs examined
moesta	1-9	5-10	8-17	10-16	10-19	16-24	15
macrura	0-9	5-10	2-11	6-11	4-15	8-14	17

The fore legs are identical but on the other two there tend to be more spines on *C. moesta* and the hind tarsi provide an absolute difference. Incidentally some of the spines on the tibiae are very small and it is often difficult to make out how many there are; the principle adopted for the present study has been to count only those that are visible under a magnification of x 120. In a count of 10 or 11 there will probably be 4-6 tiny spines, whereas, on a specimen of *C. horaria* with the same number, most will be of the same size, which is longer than the longest of *C. moesta* and *C. macrura.* These spines therefore

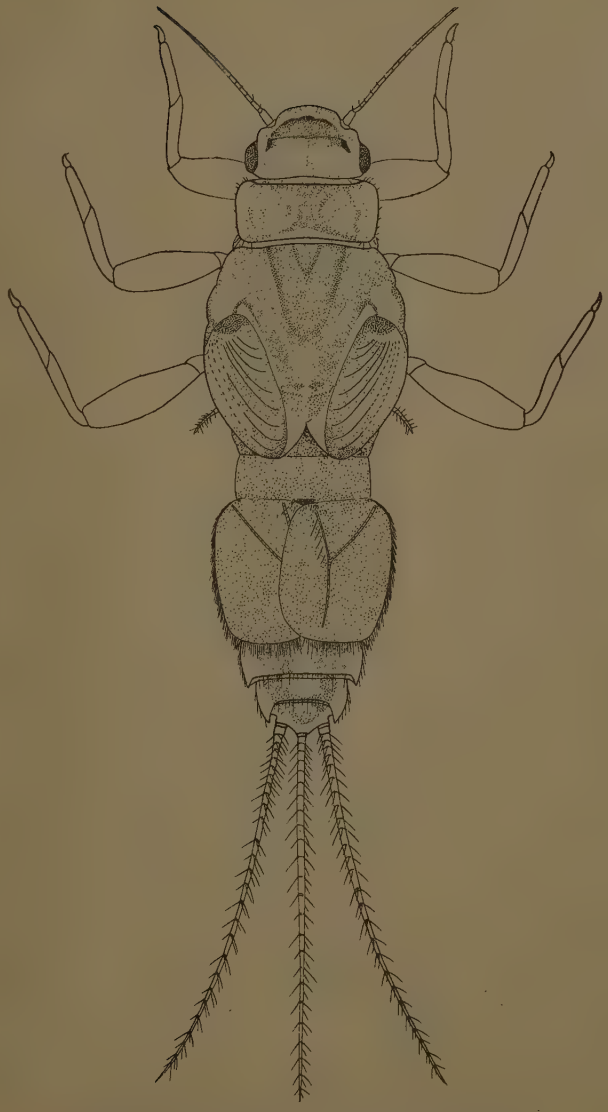

Fig. 6. *Caenis macrura*, 7 mm long, including cerci.

provide another distinguishing feature between this pair on the one hand and *C. horaria* and *C. robusta* on the other. There are always several pinnate spines on the mid tarsi and more than five pinnate spines on the hind tarsi of *C. moesta* but, of the seventeen specimens of *C. macrura* examined, not one had a pinnate spine on the mid tarsi nor more than three pinnate spines on the hind tarsi.

It will be noted that in the figures there are more spines to the inner row of the tibia on *C. macrura* than on *C. moesta* and they are longer. Both size and length however are variable, and it is not easy to base certain distinction on this character.

There are 14 to 20 or more spines in a group at the tip of the forward projection of the pronotum of *C. macrura* and they are more bunched together than those of *C. moesta,* some of them being inside the margin.

Ecological notes: C. macrura has been found on the same sort of substratum as *C. moesta* but so far only in rivers.

Caenis rivulorum

Material: River Clyde at Hyndford Bridge LA 1 cast skin and 3 whole nymphs; River Cart LA 7 cast skins and 4 whole nymphs; Wilfin Beck WL 6 cast skins and 5 whole nymphs; Stock Ghyll WL 1 cast skin; River Bela WL 1 cast skin.

This species resembles *C. macrura,* but when full-grown is distinctly smaller, males being no more than 3.5, females 4.5 mm long. It can often be picked out at once by the naked eye because of its pied appearance (fig. 7). The pronotum and mesonotum are dark and with less pattern than on the other species. The gill covers or at least the distal portion of them are also dark but, in between, the abdominal segments and sometimes the adjacent area of the gill covers are light. Beyond the gill covers there is a light abdominal segment, and then a dark tip to the abdomen completes the contrasting pattern of dark and light. The distal abdominal tergites are generally uniformly dark except at the sides. Generally the last two are quite dark, the next lighter, and the next quite light; sometimes each one counting from the last is lighter than the one before; or only the very last may be really dark. The leg markings are frequently obscure but sometimes it is evident that the basal two thirds of the femora are light and the rest of the femora and the whole of the tibiae and tarsi slightly darker. The gill covers are distinctly quadrate.

The best distinguishing feature of a mounted nymph is the fore femur which has but 3-6 paling spines in the lower group (fig. 5). Otherwise the legs are very like those of *C. macrura.* All but one of the fifteen specimens examined had a pinnate spine on the middle tarsus.

The cockade scales on the wing covers are single as in the preceding two species and usually difficult to see. There are up to 8 spines in the group at the tip of the forward projection of the pronotum. This species is less hairy than the rest, correlated with which may be its

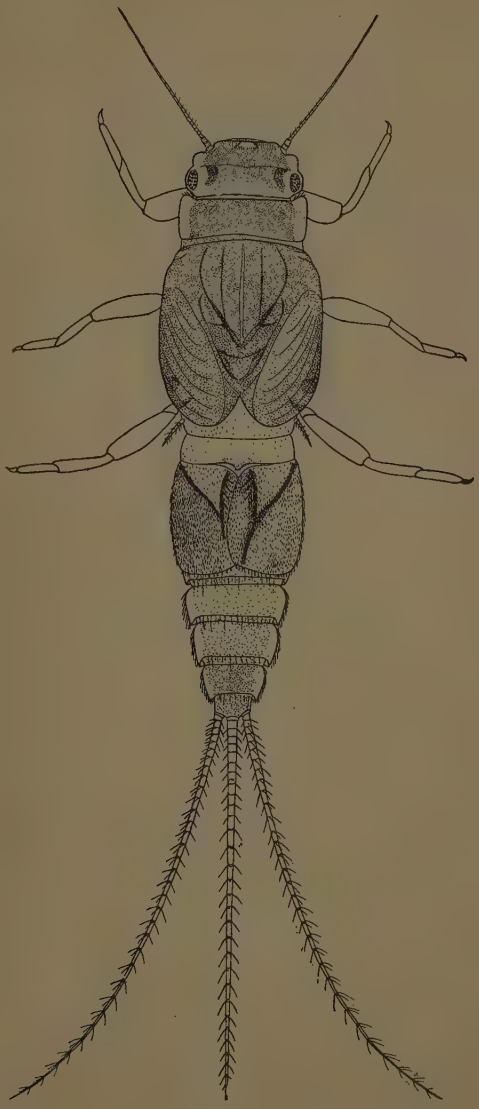

Fig. 7. *Caenis rivulorum*, 5.5 mm long, including cerci.

noticeable lack of a covering of debris when compared with the others.

Ecological notes: This species is found on a stony substratum in small streams and rivers and can possibly tolerate more flow than the others.

Brachycercus harrisella

Material: R. Clyde at Hyndford Bridge LA 8 whole nymphs.

This nymph, which is figured by Eaton (1884) and Schoenemund (1930), has a number of unique features, notably: the long second joint to the antennae; the three conical processes on the head; the shape of the pronotum; the slender legs; and the long processes of the sides of abdominal segments 3-7. A full-grown specimen is about as long as a full-grown *C. robusta* (fig. 8).

On a dissected and mounted specimen it is seen that there are no cockade scales on the gill covers, but in their place a band of tiny spines. The legs are covered with long hairs, or long very fine spines, with a row of spines along the margin of the tibiae and tarsi. There are no little teeth on the claws.

KEY

1 Three protuberances on the head; curved backwardly-directed processes on the sides of abdominal segments 3-7 (Fig. 8) ..... **Brachycercus harrisella.**

– Without either .....2.

2 Pronotum produced laterally into a point (Figs. 1, 3); more than one row of cockade-like scales in the band that runs along the underside of the gill covers, parallel with the outer and gradually converging to meet the distal margin (Fig. 2); fore femora relatively narrow (Fig. 2) .....3.

– Pronotum not produced laterally into a point (Figs. 4, 6, 7): one row of cockade-like scales in the band that runs along the underside of the gill covers (Fig. 2); fore femora relatively broad particularly towards the tip (Fig. 5) .....4.

3 Point of pronotum larger and not in line with the fore margin (Fig. 1); no central light line on head, prothorax and mesonotum nor dots on the last; full-grown nymphs up to 6 mm long from front of head to tip of abdomen; a transverse row of spines towards the tip of the fore femora (Fig. 2); 2 to 4 cockade-like scales in the band that runs along the under side of the gill covers (Fig. 2); claws long and relatively straight (Fig. 2) ..... **horaria**

– Point of pronotum smaller and in line with the fore margin (Fig. 3); a central light line running from the top of the head across the pronotum to the fore part of the mesonotum; light dots on the mesonotum (Fig. 3); full-grown nymphs up to 9 mm long; no transverse row of spines on the femora (Fig. 2); 6 to 8 cockade-like scales; claws more robust and abruptly bent (Fig. 2) **robusta**

4 A small (up to 4.5 mm long) species with a characteristic pied appearance, the abdominal segments immediately before and behind the wing covers being light and the rest of the upper surface rather dark (Fig. 7); 3-6 long pointed spines in the lower group of the row that runs transversely across the distal part of the fore femora (Fig. 5) ..... **rivulorum**

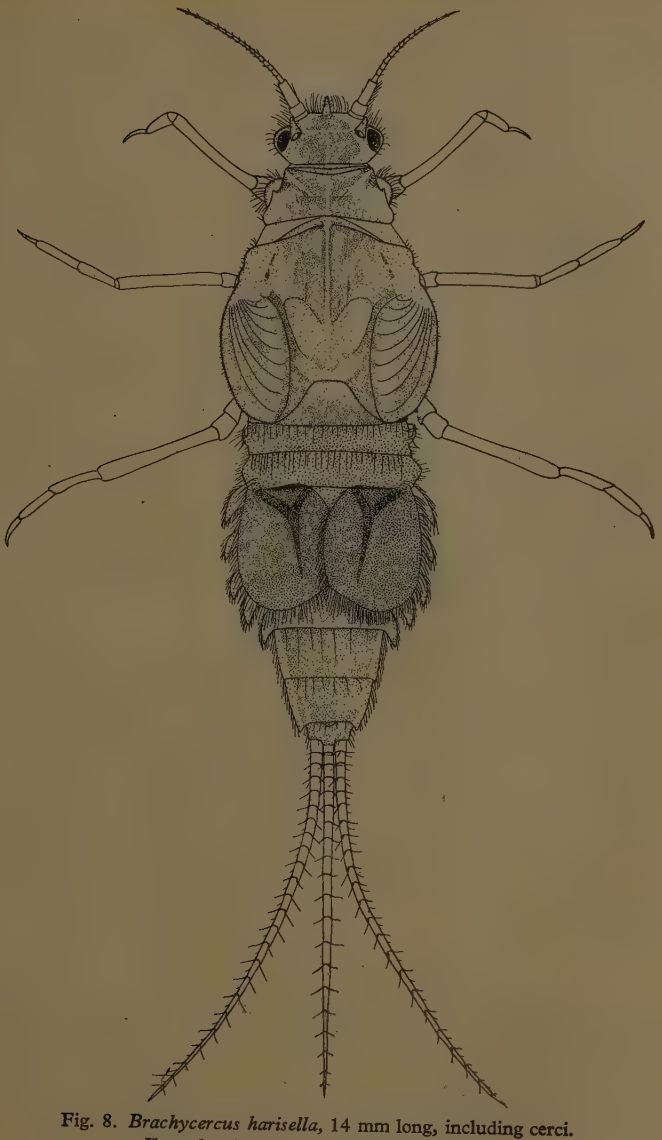

Fig. 8. *Brachycercus harisella*, 14 mm long, including cerci. From head to tip of abdomen, 8.5 mm.

– Larger species (up to 6.5 mm long) without a conspicuous pattern; 6-11 spines in the lower group of the row that runs transversely across the distal part of the fore femora (Fig. 5) (if only 6 or 7 spines they are short and truncate) .....5.

5 Pronotum broader in front than behind (Fig. 4); spines running transversely across the fore femora broad, close together, in a straight line, and 6-8 in number in the lower group (Fig. 5); 16-24 spines along the margin of the hind tarsus ..... **moesta**

– Pronotum generally parallel-sided (Fig. 6) though sometimes it is a little broader in front than behind; spines running transversely across the fore femora longer, finer, further apart, in a less regular line, and 8-11 in number in the lower group (Fig. 5); 8-14 spines on the hind tarsi ..... **macrura**

ACKNOWLEDGMENTS

Mr. Frank L. Sinclair first discovered the nymphs of *Caenis macrura* and *Brachycercus harrisella* and took me to the places to make collections. Mr. D. E. Kimmins has helped in various ways and put all his own notes at my disposal. To Dr. H. B. N. Hynes I am indebted for specimens from various places and for an opportunity to collect in the R. Wye. Mrs. Jean Mackereth has drawn most of the illustrations and helped with the collecting and breeding out. I tender sincere thanks for all this assistance.

NS North Sutherland, LA Lanark, WT Wigtown, Scotland; CV Cavan, ED East Donegal, Ireland; DB Denbigh, BR Brecknock, Wales; WL Westmorland, NO Northampton, EN, WN East and West Norfolk, England.

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DICYCLA OO (L.) IN EAST SUSSEX

In reply to Mr. D. More's query (*Ent. Gaz.*, **5**:236) a good ♂ was taken in a M.V. trap here on the night of 11th-12th July, 1954. A worn specimen was taken the following night. This is the first time I have seen this species here.

A. J. DEWICK.

Curry Farm,
Bradwell-on-Sea,
Essex.

ANTS IN THE SOUTH MIDLANDS

By C. A. COLLINGWOOD

The region considered includes the counties of the Severn Valley, namely, Gloucestershire, Monmouthshire, Herefordshire, Worcestershire, Shropshire, Staffordshire and Warwickshire. As a whole the region is rich in ants, some 28 out of a possible total of 40 British species having been recorded. The nomenclature used in this paper follows that proposed by Yarrow[1] for the *Formica fusca* group, and for the rest that current among most European workers, e.g., Stitz.[2] In the following account, hitherto unpublished county records are marked with an asterisk followed by the name of the first recorder; where no name follows the writer is responsible.

The main area is occupied by an undulating plain of triassic sandstone and marls, with a broad band of lias clay to the east fringed by the limestone scarp lands of the Cotswolds and its outliers. To the west the plain is abruptly broken by a chain of hills running approximately north to south, which includes the Wyre and Dean Forest areas, the Malvern, Woolhope and Abberley hills. A further area of lowland occupying parts of Herefordshire and Monmouthshire is terminated to the west by the uplands and mountains of Wales, which link up with the hills of S. Shropshire.

Although the northern and upland species, *Formica lemani* Bond, occurs in the region, it is restricted to the North and West outskirts, and the region both climatically and faunistically has greater affinities with S. Britain than with the North, especially within the climatically mild neighbourhood of the River Severn itself, where the greatest variety of species has been found. Here such southern species as *Leptothorax nylanderi* Foerst., *Myrmecina graminicola* Latr., *Formica cunicularia* Latr., and *Lasius brunneus* Latr., occur, while linking the area with South Wales and Ireland are *Stenamma westwoodii* West., and the rare *Myrmica schencki* Em., which are characteristic although uncommon species in parts of Ireland[3].

Large areas of the South Midlands are agricultural, but since ants are most abundant in uncultivated and wooded areas, these only are considered in the following groups:—

WOODLANDS OF THE WELSH BORDERLAND

These are mainly sessile oakwoods developed on siliceous soils in upland areas of relatively high rainfall (over 40 inches per annum). The following species have occurred:—*Formica rufa* L., *F. fusca* L., *F. lemani* Bond., on the higher and more exposed ground, *Lasius niger* L., *L. flavus* F., *M. rubra* L., *M. scabrinodis* Nyl., *M. sabuleti* Mein., *M. lobicornis* Nyl., *Leptothorax acervorum* F.

WOODLANDS ON CARBONIFEROUS AND SILURIAN FORMATIONS

These are for the most part on non-acid soils with very varied topography and vegetation. They include Wyre Forest, much of Dean Forest and various belts of woodland along the Abberley and Malvern Hills. With a rainfall of between 30 and 40 inches per annum this area is considerably milder than the Welsh border and has a varied ant fauna, including several of the rarer species of the region, such as *Formicoxenus nitidulus* Nyl., *Stenamma westwoodii* West., *Formica cunicularia* Latr., *Myrmica sulcinodis* Nyl., and *M. schencki* Em. Other species recorded include *F. rufa* L., *F. sanguinea* Latr., *F. fusca* L., *Lasius fuliginosus* Latr., *L. umbratus* Nyl., *L. mixtus* Nyl., *L. flavus* F., *L. niger* L., *Myrmica rubra* L., *M. laevinodis* Nyl., *M. scabrinodis* Nyl., *M. sabuleti* Mein., *M. lobicornis* Nyl., and *Leptothorax acervorum* F.

LOWLAND DRY OAK WOODLANDS

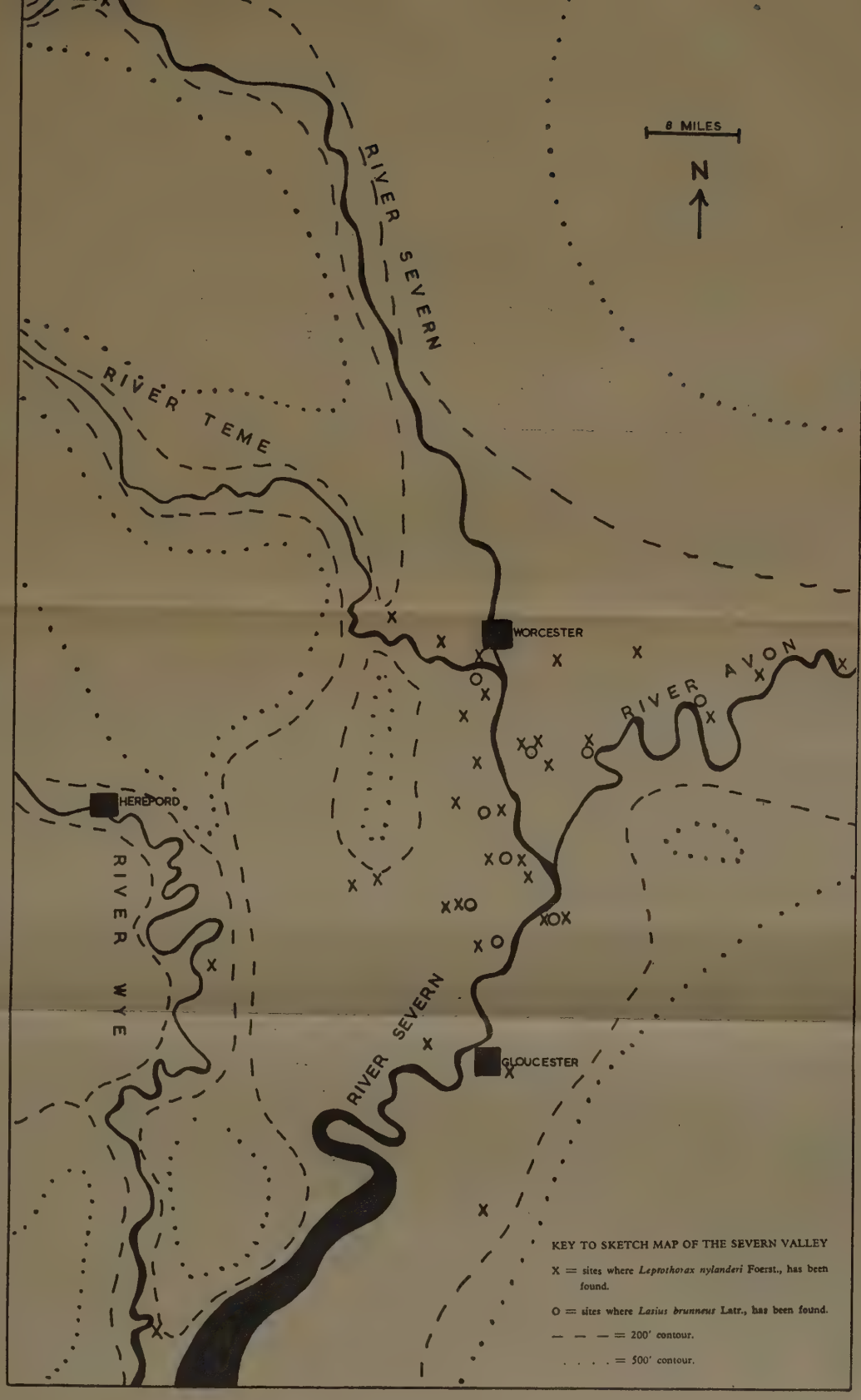
These are developed on acid sandstone and thin marls and include such woods as Bentley and Oakley in Warwickshire and the Bromsgrove woodlands in Worcestershire. Characteristically they consist of sessile oak, often with a more or less dense bracken floor and are poor in species. Frequently only *Myrmica rubra* L., and *M. scabrinodis* Nyl., are to be found with *F. fusca* L., and *Leptothorax acervorum* on the borders. Lasius spp. are occasional, but have included *L. fuliginosus* Latr., *L. umbratus* Nyl., *L. flavus* F., and *L. niger* L.

LOWLAND ASH—OAK WOODLAND AND PARKLAND

These on base-rich soils on Keuper marl or Lias clay occur in the warm river valleys of the Severn and Avon in an area of low rainfall (about 25 inches per annum). On the more favourable sites, such as Wood Norton, near Evesham, a very varied ant fauna has been found. *Lasius* spp. are abundant and include *L. fuliginosus* Latr., *L. umbratus* Nyl., *L. mixtus* Nyl., *L. flavus* F., *L. niger* L., and the very local *L. brunneus* Latr. *Myrmica laevinodis* Nyl., *M. rubra* L., *M. scabrinodis* Nyl., *M. sabuleti* Mein., *Leptothorax acervorum* F., *L. nylanderi* Foerst., *Stenamma westwoodii* West., and *Myrmecina graminicola* Latr., have occurred. *F. rufa* L., is characteristically absent, but *F. fusca* L., is present on the drier areas.

HEATH

Dry Calluna heath is restricted to a few small areas including parts of S. Staffordshire, Hartlebury Common in Worcestershire, and Sutton Park in Warwickshire. On Hartlebury Common the ant population is dominated by *Lasius alienus* Foerst., which is very abundant. Other ants recorded include *F. fusca* L., *L. flavus* F., *L. niger* L., *Leptothorax acervorum* F., *M. rubra* L., and *M. scabrinodis* Nyl. On the heath at Sutton Park, which is at a higher elevation (over


8 MILES
N
RIVER SEVERN
RIVER TEME
WORCESTER
RIVER AVON
HEREFORD
RIVER WYE
RIVER SEVERN
GLOUCESTER
KEY TO SKETCH MAP OF THE SEVERN VALLEY
X = sites where Leptothorax nylanderi Foerst., has been found.
O = sites where Lasius brunneus Latr., has been found.
— — — = 200' contour.
. . . . = 500' contour.

500 feet), *F. fusca* L., is replaced by *F. lemani* Bond. *L. alienus* Foerst., is scarce and *M. lobicornis* Nyl., has been taken.

Cotswold Scarp Land

These are calcareous uplands between 200 feet and 1,000 feet elevation. *F. fusca* L., is fairly abundant in wooded areas. *L. flavus* F., *L. niger* L., *M. rubra* L., *M. scabrinodis* Nyl., *L. acervorum* F., are common; *Lasius alienus* Foerst., and *Myrmica sabuleti* Mein., are locally abundant, *M. lobicornis* Nyl., and *L. mixtus* Nyl., are occasional; *M. laevinodis* Nyl., is frequent on the lower slopes. In the southern area from Stroud to Bath the hills are lower and more deeply indented, and additional species, including *F. rufa* L., *F. cunicularia* Latr., *Myrmecina graminicola* Latr., and *Leptothorax nylanderi* Foerst., have been recorded.

Discussion of Species and County Distribution

Formica rufa L., the wood ant, is very abundant throughout Wyre Forest, on the limestone areas of Dean Forest, the Woolhope area of Hereford and the Newent woodlands of the Hereford/Gloucestershire border. Other Hereford localities include Buckton on the Shropshire border and Stanner Rocks on the Radnor border. This species occurs in Monmouthshire (Hallett),[4] and has been recorded from many places in the S. Gloucestershire Cotswolds,[5] where, however, colonies are few and widely scattered. The species no longer occurs in many of the older recorded sites listed by Nelmes,[6] being absent, for example, from Shrawley, Worcs., Sutton Coldfield, Warwicks., Hollybush, Herefords., and Shirlett, Salop, all sites of previous records. It still occurs at Moddershall, Staffs., Trench Wood, Worcs., on drift soil, where it is now nearly extinct, and in Hay Wood, Warwicks., where its territory has much diminished following the felling of most of the wood during the war. The overall picture is one of decline and extinction in the smaller woodlands of the region, while the species continues in great abundance in parts of the larger woodlands.

F. exsecta Nyl., was recorded by Blatch[7] for Wyre Forest, but has not subsequently been found there.[8]

F. sanguinea Latr., is abundant in Wyre Forest, has been recorded from Much Wenlock, Salop, by Whitaker,[9] from Trelleck, Monmouth, by Hallett,[10] and from the Forest of Dean, Glos.[11]

F. fusca L., is abundant generally and overlaps with the northern and uplands species *F. lemani* Bond. on the Welsh Border and in North Warwicks., Staffs., and North Shropshire.[12]

F. cunicularia Latr., (= *glebaria* Nyl., and *glebaria* var *rubescens* For.) is recorded from Monmouthshire[13]; Donisthorpe took it in Wyre Forest in 1908-1909,[14] but the species has not been seen there since 1916. There are several old records by Perkins and others for W. Gloucestershire.[15]

Lasius fuliginosus Latr., is widely distributed in Gloucestershire and Warwickshire, is common in Worcestershire, and occurs in Herefordshire and Staffordshire, but is not yet recorded for Salop or Monmouth.

L. niger L., and *L. flavus* F., are very abundant.

L. alienus Foerst., occurs in the S. Malverns and at Donington Park, Hereford,* at Hartlebury Common and Bredon Hill, Worcs.,* several areas in W. Glos. and at Painswick quarries, E. Glos.* Recorded by Saunt for Napton, it has also been found at Burton Dassett and Sutton Park, Warwicks.

L. brunneus Latr., is a tree inhabiting ant characteristically occurring in park-like country. It was first discovered in the Midlands in 1950 at Croome Park, Worcs.,[16] but has been found inhabiting oak trees in hedgerows, pastures and woodland fringes below Wood Norton along the Avon and at Powick, Longdon, Queenhill, Bushley, Eldersfield and Upton-on-Severn, Worcs., near Tewkesbury, E. Glos.,* and at Tirley, W. Glos.,* all along the Severn.

All sites are at low altitudes (below 200 feet). I have not searched for this ant further south into Gloucestershire, where it will undoubtedly be found. Colonies occur within the interior of the tree and are usually inaccessible; the ant is best sought for on a warm summer's day, when workers may be seen at the base of, or ascending the trees. The distribution of this species and of *Leptothorax nylanderi* Foerst., closely follows the Severn and Avon valleys (see map).

Lasius mixtus Nyl., and *L. umbratus* Nyl., are widely distributed, but not yet recorded from Shropshire or Monmouth.

Formicoxenus nitidulus, Nyl., an inquiline species in the nests of *Formica rufa* L., has been recorded for Wyre Forest, Worcs.,[17] and Hay Wood, Warwicks.[18]

Myrmica rubra L., *M. Laevinodis* Nyl., *M. scabrinodis* Nyl., and *M. sabuleti* Mein., are all common and widely distributed.

M. lobicornis, Nyl., has been taken in several localities, including Stanner Rocks, Hereford,* Malvern, Bredon Hill and Eymorewood, Worcs.,* Chamberline Wood, Salop,* by D. Allen at Solihull, Warwicks.,* where it has also occurred at Sutton Park, Packington, and at Burton Dassett. This species is usually found in small, isolated colonies. It is also recorded for W. Glos.[19]

M. schencki Em., one single worker of this species was taken by W. E. Hammond and K. G. V. Smith in a part of the Wyre Forest (Chamberline Wood), Salop,* in 1946, and was sent to me among other ants to name. I am indebted to Dr. I. H. Yarrow for identifying the ant. Since then repeated visits to the Wyre Forest and examination of hundreds of *Myrmica* ants from the region as a whole has failed to reveal further specimens. This species is evidently very rare, and this single specimen is the only one so far recorded for

England. It was first discovered in Britain in 1915 by Hallett [20] at Sully in Glamorgan.

M. sulcinodis Nyl., was recorded by Ellis [21] for the Wyre Forest, but no specimens have been seen in recent years.

Leptothorax acervorum F., is abundant in all counties, including Monmouth * (Hallett), Worcs.,* Warwicks.* and Salop,* and has been found in every woodland where sought for. In the lowland Ash-Oak woodlands colonies of this species have frequently been found where workers and females are pale and brightly coloured with brown antennal clubs, contrasting with the more typical, darker form found in upland and non-calcareous woodlands.

L. nylanderi Foerst., this species was recorded by Fletcher for Worcs. as *L. tuberum* F.,[22] which does not occur in the region. A bark inhabiting species, it has been found in many places in S. Worcs. and Glos., also in S. Warwicks. and S. Hereford, where it is more scarce.[23] Hallett has recorded it for Chepstow,[24] Monmouth, and Hodson for Shrewsbury, Salop,[25] its most northerly station in the British Isles. Its recorded distribution follows closely the rivers Wye, Teme, Severn and Avon (see map). As with *L. brunneus* Latr., it does not occur on land over 200 feet, but appears to be equally abundant in isolated groups of trees and hedgerows as in woodlands and coppices in the lower river areas.

Stenamma westwoodii West., was recorded by Fryer for Warwicks.,[26] and has also been found by D. Allen at Priors Marston, Warwicks. First recorded for Worcester at Hallow,[27] it has now been found in several woodlands in the county, including Wood Norton, Tiddesley, Himbleton, and two localities in Wyre Forest. It has also been recorded for Monmouthshire by E. J. Pearce.[28]

Myrmecina gramincola Latr., has been recorded from several places in West Gloucestershire,[29] and has been found by the writer in South Worcestershire.[30] This species, like *S. westwoodii* is of very unobtrusive habits. Normally occurring in limestone areas nesting under stones, there is an old record for Colwich, Stafford, of the discovery of colonies in tree stumps by Martineau.[31]

Ponera coarctata Latr., was recorded in the previous century for Warwickshire at Warwick (Baly),[32] and at Sutton Coldfield (Bradley).[33] The ant is not otherwise known for this region, and these records may perhaps refer to the glass-house species *P. punctatissima,* Roger. This last species, considered as native by Donisthorpe,[34] has also been recorded for the region, having been taken by Farren-White [35] in a hot-house at Minchinhampton.

Monomorium pharaonis, L., is a cosmopolitan species long established in Britain on domestic premises. Recorded for Birmingham, Warwicks.,[36] and for W. Glos. by Farren-White,[37] it has been taken in recent years at Cheltenham, E. Glos.,* and at Worcester, Evesham and Malvern in Worcestershire.*

TABLE I — COUNTY DISTRIBUTION

Species	West Glos.	East Glos.	Mon-m'th.	Here-ford	Worc.	Salop	Staff.	War-wicks.
Ponera coarctata Latr.								?
Ponera punctatissima Roger	X							
Myrmecina graminicola Latr.	XX				XX		X	
Formicoxenus nitidulus Nyl.					XX			X
Monomorium pharaonis L.	X	XX			XX			X
Myrmica laevinodis Nyl.	XX	XX	XX	XX	XX	XX	XX	XX
Myrmica rubra L.	XX	XX	XX	XX	XX	XX	XX	XX
Myrmica sulcinodis Nyl.					X			
Myrmica scabrinodis Nyl.	XX	XX	XX	XX	XX	XX	XX	XX
Myrmica sabuleti Mein.	XX	XX	XX	XX	XX	XX	XX	XX
Myrmica lobicornis Nyl.	XX			XX	XX	XX		XX
Myrmica schencki Em.						XX		
Stenamma westwoodii West.					XX			XX
Leptothorax acervorum Fab.	XX	XX	XX	XX	XX	XX	XX	XX
Leptothorax nylanderi Foerst.	XX	XX	XX	XX	XX	XX		XX
Lasius fuliginosus Latr.	XX	X		XX	XX		XX	XX
Lasius niger L.	XX	XX	XX	XX	XX	XX	XX	XX
Lasius alienus Foerst.	XX	XX		XX	XX			XX
Lasius brunneus Latr.	XX	XX			XX			
Lasius flavus F.	XX	XX	XX	XX	XX	XX	XX	XX
Lasius umbratus Nyl.	XX	XX			XX		X	XX
Lasius mixtus Nyl.	XX			XX				XX
Formica rufa L.	XX	XX	XX	XX	XX	XX	XX	XX
Formica exsecta Nyl.					?			
Formica sanguinea Latr.	XX		XX		XX	XX		
Formica fusca L.	XX	XX	XX	XX	XX	XX	XX	XX
Formica lemani Bond.			XX			XX	XX	XX
Formica cunicularia Latr.	X		XX		X			
Total 28?	21	15	13	14	23?	14	13	20?

X = no record in past 30 years.
XX = recent record.
? = doubtful record.

I wish to thank the following who have sent me specimens or records of captures—Messrs. D. Allen, R. S. George, H. M. Hallett, J. W. Saunt and K. G. V. Smith, also Dr. I. H. H. Yarrow, who has determined doubtful specimens.

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AN APPARENT MIGRATION OF *SYMPETRUM DANAE* (SULZ.) (ODONATA) IN IRELAND

Mr. D. J. O'Sullivan, Principal Keeper at Tory Island Lighthouse, West Donegal, reported that large numbers of the Silver Y Moth, *Plusia gamma* (L.) appeared on the nights of the 6th and 7th September, 1954. They were accompanied by numbers of dragonflies which also abounded during the daytime. The flight course was north-west, specimens being also seen on the 22nd August. Specimens were submitted to Mr. E. S. Baynes and eventually, through the kindness of Col. Niall MacNeill, were sent to me for identification. It had been suspected that *Sympetrum danae* had a tendency to migrate, but this is the first time an apparent mass movement has been witnessed.

A. E. GARDNER.

DRAGONFLIES AND PREY

A ♀ *Cordulegaster boltoni* (Don.) was captured at Hurn, Hants., 18.vii.54, which had partially devoured a ♀ *Sarcophaga* sp. (Diptera). Mr. F. T. Vallins reported *Anax imperator* Leach preying on the Large White *Aporia crataegi* (L.) at Lac-de-la Roche-de-Rame, Hautes-Alpes, 23.vii.54. Mr. Vallins also kindly presented me with a ♀ *Aeshna caerulea* (Strom.) which was preying on the Common Heath Moth, *Ematurga atomaria* (L.), Aviemore, Inverness, 12.vi.53. I am indebted to Mr. L. Parmenter for the identification of the Diptera.

A. E. GARDNER.

29 Glenfield Road,
Banstead, Surrey.

A NOTE ON THE IDENTITY OF *COLEOPHORA TRIPOLIELLA* HODGKINSON, 1875, AND *C. VIRGAUREAE* STAINTON, 1857 LEP.: COLEOPHORIDAE

By J. D. BRADLEY

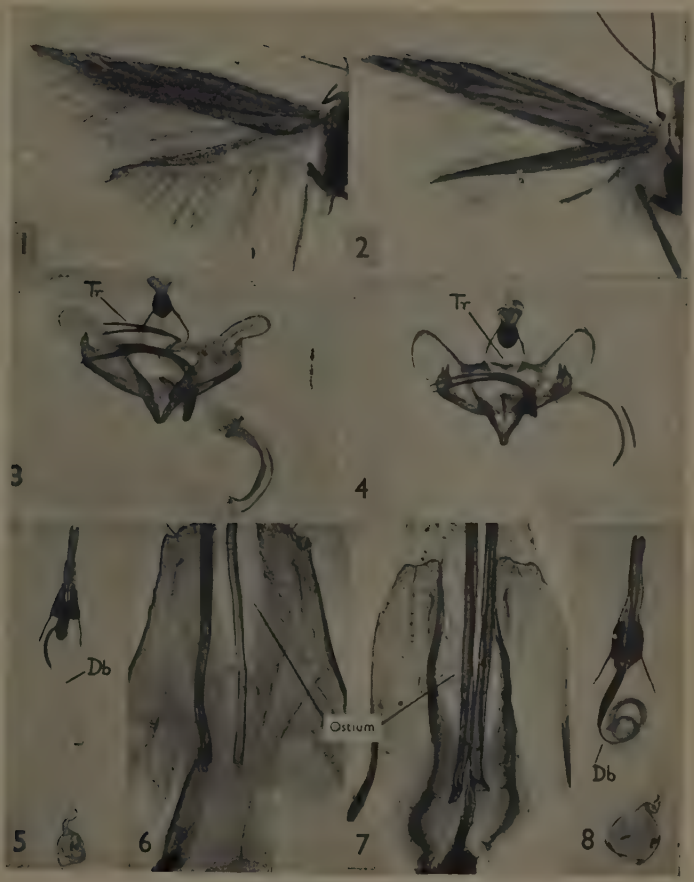
Dept. of Entomology, British Museum (Natural History)

In a recent work by Toll (1953, Eupistidae of Poland) the genitalia of *Coleophora asteris* Mühlig are illustrated. The figures appear to be identical with those of *C. tripoliella* Hodgkinson published by Pierce (1935, The Genitalia of the British Tineina). Although the type of *asteris* has not been seen by Dr. Toll, its present whereabouts not being known, there seems no reason not to accept his identification, and to let the name *asteris* take precedence over *tripoliella,* since it is the earlier.

In introducing this synonymy it will first be necessary to fix a lectotype for *tripoliella,* as no type was indicated by the author and the type material, part of which is in the British Museum (Natural History) and part in the Royal Albert Memorial Museum, Exeter, has proved on examination to be mostly examples of *Coleophora virgaureae* Stainton. There is no doubt that Hodgkinson distinguished between *virgaureae,* which feeds on *Solidago virgaurea,* and the species on *Aster tripolium* known in the British lists as *tripoliella.* By an unfortunate chance it seems that *virgaureae* occurred in the locality from which he obtained *tripoliella,* and that it too was feeding on *Aster tripolium.* This is borne out by a larval case mounted with one of the specimens in the type series of *tripoliella,* and although determined as *tripoliella* and bred from *Aster tripolium* it is in fact *virgaureae.* The larval case in question is shown in fig. 3 and does not have the porcupine appearance of larval cases of *virgaureae* on *Solidago virgaurea,* fig. 2, lacking the fine filaments of seed-down. The larval case of *tripoliella,* fig. 1, is rather long and cigar-shaped with a nude surface and the mouth is turned only slightly to the side when the case is occupied by a larva—the case shown in fig. 1 has been used as a puparium and the lip is consequently somewhat broken and ragged. In *virgaureae* the opening of the larval case is at the side as shown in fig. 3.

There being no type of *Coleophora tripoliella Hodgkinson,* 1875 (Entomologist, **8**: 55), an example of the few true *Aster tripolium* feeder in the type series may be selected as a lectotype, and a male bearing the following data is now designated: —'e Coll. B. Dr. Mason'; genitalia preparation B.M. 3570. *Coleophora tripoliella* Hodgkinson, thus becomes a synonym of *C. asteris* Mühlig, 1864 (Stettin. ent. Ztg., **25**: 162).

A lectotype of *Coleophora virgaureae* Stainton, 1857 (Entomologist's Annual, 1857, p. 105), is also required, a type not having been indicated by the author; and a male in the Stainton collection in the



Coleophora asteris Mühlig and *C. virgaureae Stainton.*

Fig. 1, *C. asteris*, adult ♂. Fig. 2, *C. virgaureae*, adult ♂. Fig. 3, *asteris*, ventral view of male genitalia. Fig. 4, *virgaureae*, ditto. Fig. 5, *asteris*, ventral view of female genitalia. Fig. 6, *asteris*, enlargement of Ostium. Fig 7, *virgaureae*, enlargement of Ostium. Fig. 8, *virgaureae*, ventral view of female genitalia.

British Museum (Natural History) bearing the following data is now designated:—'Exeter, 1856, S358/56 Stn. Stainton coll. *C. virg.*, g'; genitalia preparation B.M. 2908.

The adults of *asteris* and *virgaureae* are illustrated in Plate 3 figs. 1 and 2 respectively. The silvery lines on the forewing of *virgaureae* usually distinguish this species from *asteris*, but sometimes these markings may not be sufficiently distinct, and identification is best made by examining the genitalia. The characteristic two-pronged transtilla (**Tr**) in the male at once distinguishes *asteris*, fig. 3, from *virgaureae*, fig. 4. The female genitalia of *asteris*, fig. 5, do not have the ductus bursae (**Db**) coiled shortly after the ostium as in *virgaureae*, fig. 8, and the cleft in the ostium plate (**Ostium**) in *asteris*, fig. 6, is narrower and more pointed than in *virgaureae*, fig. 7.

I am indebted to Major A. S. Gay, of the Royal Albert Memorial Museum, Exeter, for making the series of *tripoliella* in the STUDD collection available for study; and to Messrs. L. T. Ford and S. Wakely for providing freshly caught material of *asteris* (=*tripoliella*) and *virgaureae*.

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Larval cases of *Coleophora asteris* Mühlig and *C. virgaureae* Stainton.

Fig. 1, *C. asteris*—on *Aster tripolium*. Fig. 2, *C. virgaureae*—on *Solidago virgaurea*. Fig. 3, *C. virgaureae*—on *Aster tripolium*.

FURTHER OBSERVATIONS ON *CALOPHASIA LUNULA* HUFN.

By G. HAGGETT, F.R.E.S.

DURING THE second week of June, 1954, Mr. L. Christie most kindly sent me eighteen eggs of *C. lunula,* obtained by him from pairings made between moths he had bred from Eastbourne larvae collected the previous autumn. The eggs were laid mostly along much curled leaves of *Linaria,* on both surfaces, some in pairs. A month later we discovered eggs laid in the wild on low growing *Linaria,* and these were disposed in much the same way, except that they were laid only on the upper sides of the leaves.

Description of the Egg. Bluntly dome shaped, .8 mm., tall, almost as wide, marked with bold vertical ribbing that divides irregularly into two or three arms about halfway towards the base. The ribs are strongest at the micropylar surround and there number about ten. Colour, a pale waxen cream when laid, reddish blotches appearing after 4 days, darkening further, until by the seventh day the whole egg is a pearly grey: a narrow band around the base may remain clear of red spotting in fertile eggs. The eggs hatch in 8 to 10 days.

Description of the newly hatched larva. Measures rather over 2 mm. long, colour a velvety pale grey, darker between segments, no markings except dorsal warts, which are black and prominent, each emitting a thick sturdy black hair; all legs grey, head pale brown, much freckled with darker brown. Has the habit of sitting like a looper, gripping only with the last two pairs of prolegs and the anal claspers. At the end of the first instar the larva is pale shining grey, with a paler dorsal line and indistinct darker lateral shading, the small brown prothoracic plate being better defined.

Description of second instar. From the first moult the little larva becomes recognizable as a darkly suffused miniature of the full grown larva, being dark purplish black along the back, with a broad pale yellow dorsal line, pale ochreous shading into blue-grey laterally and below, with dusky streaks low down along the sides. Heavy black warts cover the body, the largest forming black blotches each side of the dorsal line. Head and all legs ochreous-grey speckled with black, and there are stiff erect hairs from the warts.

After the second moult the larvae measure 11 mm. long and have the colours much sharper, the large dorsal pattern of the mature larva being on a still dark purplish grey skin; head and all legs as in the later instars, the larva still rather hairy. From the third moult the subspiracular bands became evident and there were no obvious changes to the full grown larva.

The tiny larvae had fed up at first on young tightly packed leaflets

at the shoots of the plant, but fed freely on larger and older leaves after the first moult.

Summary of moults and progress at 70 deg. F.

Eggs laid	June 11
Eggs hatched	„ 19
First moult	„ 23
Second moult	„ 25
Third moult	„ 28
Fourth moult	July 2
Spun up	„ 9
Pupation	„ 12
Emergence	Aug. 6

Three eggs failed to hatch, and of the young larvae 9 produced pupae following closely the above time table (of the first larvae), the others never got going, and although some reached the third instar they were all dead by 9th July. Many collectors it seems have now discovered that it is unwise to take young *lunula* larvae, as few survive to produce healthy pupae; a good many die young, others spin up but fail to pupate, whilst not a few produce very undersized pupae.

These *lunula* spent longer in the pupal stage than as larvae, while the overwintering pupae are dormant for 8 to 10 months.

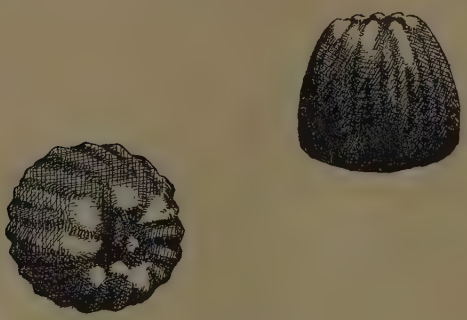
Broods and habitat. In 1954 there was only one certain, if prolonged, brood in West Sussex, larvae appearing from late June, with peak abundance at the middle of July to the beginning of the last week, while a few dwindled on into August, but further into East Sussex and in Kent a second brood was completed in September. On 4th July in one of the West Sussex stations we discovered larvae in all instars, with some about to pupate, and also a number of easily found eggs, some even on footplant brought away unexamined; already at that date the *Linaria* was much ravaged or showed extensive blanching from the attacks of earlier larvae. We thought at the time that *C. lunula* might be one of those continuously emerging species that may be taken in all stages throughout the summer, but by the end of July there were very few larvae still feeding (even in the lesser known stations).

There must certainly be a good deal of over-lapping in the life cycles of individuals within one brood, however, and I believe our figure of twenty days' active life span of the larva in captivity to be much the same for those in the wild state, so that the offspring of the earliest moths to emerge may well be down for pupation, while late moths of the same brood are only emerging and pairing.

The species is evidently one that has a short larval life of rapid growth under warm conditions that, so far, are known in this country to be entirely maritime or submaritime. A few larvae discovered at Tonbridge in this summer are the only inland records to my knowledge.

Foodplants.

Most wild collected larvae have been found feeding on the common yellow flowering *Linaria vulgaris,* but the cultivated *L. purpurea* is also eaten, while in the wild the tiny garden escape *L. minor* is equally accepted.



C. lunula.
Eggs much enlarged.

LEUCANIA PUTRESCENS HB. (DEVONSHIRE WAINSCOT) IN PEMBROKESHIRE

I think it is worth reporting the capture of a single specimen of this species by Mr. F. R. Sutton and myself in M.V. light, near Fishguard, 30th June, 1954.

JOHN E. KNIGHT, F.R.E.S.

'Doughton Cottage',
Ross-on-Wye, Herefs.

THE LARCH BUD MOTH *EUCOSMA GRISEANA* (HUEBNER)

Professor P. Bovey of the Entomologisches Institut, Zurich, is working on the distribution of *E. griseana* in Europe. Precise details of this species in Great Britain (localities, date of capture and number of individuals) are urgently required. Please forward information to Professor P. Bovey, Entomologisches Institut, Der Eldg, Technischen Hochscule, Zurich, Universitatstrasse 2, or to Dr. D. K. McE. Kevan, School of Agriculture, Sutton Bonnington, Loughborough.

A WEEK IN THE LAKE DISTRICT—JULY, 1954

By ROBIN MERE

These notes on a few days' holiday in the Lake District may be of interest to those who have not been fortunate enough to collect in this beautiful area.

The object of the holiday was *Amathes alpicola* (Zett.). In the course of searching for beetles near the top of Skiddaw one July afternoon in 1950, F. T. Vallins, his wife and two acquaintances were turning over stones and boulders. One of Vallins' companions found on the underside of a boulder a moth which Vallins boxed and identified as *alpicola*. It seemed extremely improbable that one straying *alpicola* from the Scottish Highlands, some hundred and more miles away, should have alighted unerringly near the top of England's second highest mountain. In view of the numerous collectors who have worked the Lake District for many years, it had seemed unlikely that *alpicola* was breeding and resident on Skiddaw, or other mountain tops in the Lake District. But, as an explanation of the presence of one single specimen so far from its known haunts, the latter was the more likely theory. It was decided to make an effort to prove that this theory was also fact.

Accordingly, Vallins, E. W. Classey, Hugh and Peter Robinson and I went to the Lake District at Easter, 1952. We spent many hours searching the upper part of Skiddaw for larvae of *alpicola*. Bilberry and bearberry are common enough, but we found not a single larva. The weather was unpleasant, with rain, sleet, snow showers, and a chilly wind: in fact what one might expect in early or mid-April. The terrain was different from the part of the Highlands of Scotland where *alpicola* occurs. There one finds rocks overgrown with reindeer moss: here the moss was growing over a considerable thickness of peaty soil, so that rolling back the moss produced no suitable well-drained pupation place. So, because of the moth's two-year cycle, it was decided to try to take the moth in the summer of 1954 by means of a lightweight mercury vapour lamp and generator to be carried up Skiddaw.

Between April 1952 and July 1954 various enquiries were put on foot to see if it were practicable to carry the existing type of 'Portable' Mercury Vapour generators up the mountain by means of a Jeep, a pack horse or the like, but no satisfactory method was found. A road fit for motor-cars goes up some 700 feet, but from that level the gear would have to be manhandled. The normal M.V. generator weighs about one hundredweight, and was clearly not a practicable proposition. Peter Robinson experimented during the intervening two years, and produced a remarkably ingenious, yet basically simple, lightweight generator, which, complete with a length of flex and lamp, weighed 57 lbs., and fitted on to a frame that could be slung over one's shoulders like a rucksack. What is more,

this apparatus would run a 125 watt M.V. lamp at good brightness, using a reasonably small quantity of fuel. This was important. It must be remembered that petrol, oil and all other requirements had to be carried up Skiddaw. This apparatus was a remarkable success. It performed perfectly under adverse conditions for two nights, and the fact that it failed on the third night was nothing to do with its design or construction.

We had hoped that the same five of us would make the July 1954 expedition. Unfortunately, Classey and Hugh Robinson were unable to get away. Vallins and I reached Keswick on 10th July, and were joined by Peter Robinson the next day. I should say straight away that there was no sign of *alpicola,* which we put down to the appalling weather. Nevertheless, we had a most interesting and enjoyable time. Two more cheerful companions in adversity I cannot imagine. Even the complete refusal of the generator at the top of Skiddaw between 10 p.m. and 1 a.m. to run for more than five seconds consecutively failed to damp their good humour and leg-pulling propensities.

We stayed at a Hostel known as Underscar, a good mile out of Keswick, and some 400 feet up on the lower slopes of Skiddaw. The grounds of Underscar are well wooded with oak, elm, birch, beech, mountain ash, pine, larch, sallow, etc., as well as fruit and ornamental trees and shrubs. Immediately above the grounds the open mountainside started, covered with grasses and some bracken and heather. At Underscar we were given every facility and help, and allowed to run from the mains electricity a M.V. lamp and trap in the grounds. This lamp we placed in a clearing in the woods some 90 yards from our plug in, and ran for six nights. In all we took 117 different species of Macrolepidoptera in, or settled near this trap. Fresh species were recorded each night. A longer stay would probably have raised the total considerably. As a Southerner who has spent but little time in the North, I was particularly glad to see *Plusia bractea* (Schiff.), *P. interrogationis* (Linn.), *Xanthorhoë munitata* (Hub.), *Entephria caesiata* (Schiff.) and *Venusia cambrica* (Curt).

We spent three hour one evening at the top of Wrynose Pass with a normal portable M.V. apparatus which ran two 125 watt lamps. This was well over 1000 feet above sea level, and we saw no tree anywhere near. Nevertheless we took one *Pheosia gnoma* Fab. and one *Tortrix viridana* L. The most notable of the twenty-four different species of macros seen were several of the beautiful dark form of *Ammogrotis lucernea* (L.).

Another evening with the two-lamp generator was spent beside Lake Windermere. In spite of poor weather forty-seven different species of macros were recorded, including *Tethea fluctuosa* (Hübn.) and *Schranckia costaestrigalis* Steph.

Daytime activities included two visits to Meathop Moss and one to some moorland near Kendal. Meathop produced a more solid

mass of clegs than I've ever seen before. Other insects seemed scarce, possibly as the result of last year's disastrous fire. A few *Coenonympha tullia* (Müll.) were seen, and one *Scopula ternata* (Schr.). We had hoped to find *Sterrha muricata* (Hufn.), but we appeared to be too early in this late season: it was just emerging in Surrey ten days later.

The weather prevented us from trying to find *Erebia epiphron* (Kn.) in any of its haunts.

All these were but sidelines: *alpicola* was our quarry. After tea on 12th July we set out with our gear. Robinson insisted on trying to carry his 'baby' the whole way on his back, and in spite of our protestations and offers of help he did so. Vallins and I carried between us a gallon of petrol, a quart of oil, the usual nets, boxes and other entomological apparatus, overcoats and woollies for three, some spares for the M.V. apparatus, thermoses of hot coffee, sandwiches and cake, and a bottle of invaluable brandy. Our loads were well below the 57 lbs. of the generator, but nevertheless unpleasantly heavy. With numerous pauses for breath we eventually reached our objective, an elevation of some 2700 feet on what we hoped would be the lee side of the highest ground. Dusk is late at that height, and we had time to spare. About 9.30 p.m. a *X. munitata* was netted as it was being blown along by the wind. The M.V. generator was started about 10 o'clock. Unfortunately, as dusk deepened the wind increased, the sky cleared and visibility increased, so that we could clearly see the Scottish coast over the Solway Firth. But not for long—soon the sky round us became overcast. Cloud was forming over Skiddaw and swirling round us, first from one side of the highest ground, then from another, sometimes above us, and at others we were in the cloud or even above it. The wind became strong and gusty. We sought a sheltered spot. None was to be found. It became unpleasantly cold, but the vigil was maintained with that artless optimism which imbues the hunter of rare things. Near three o'clock, as the first faint signs of dawn were visible in the north-east, we gave up and descended the mountain. We had taken *Eumichtis adusta* (Esp.) and *Apamea monoglypha* (Hufn.) at M.V. The M.V. set was left on the mountainside under a cover.

The really bright fact was that the highly experimental generator had run perfectly.

The next night the cloud came down on Skiddaw, and both ascent and descent were tricky and dangerous through risk of losing the route. It rained hard most of the time, and very hard the rest of the time. The generator ran perfectly, though the lamp was not as bright as it should have been owing to electrical leakage from the pervading wet. Two *X. munitata* were taken. The M.V. set was again left on the mountainside, but being thoroughly wet it was not covered, so that it might dry out when the rain stopped.

The third night up Skiddaw was the last night but one of our Lakeland holiday. We found that some well intentioned person had

covered the M.V. set with a cover that had been left under it. This was disastrous. Being very wet when placed under the cover, and being unable to dry out, the whole set was thoroughly damp right through. In spite of three hours' work on it by torchlight it refused to start. Occasionally a cough from the exhaust would raise our hopes: and the motor would run for a few seconds. Eventually we gave up, had our coffee, sandwiches, cake and brandy, and returned. Robinson again carried the M.V. set most of the way down, Vallins taking over where his mountain boots were of assistance to prevent slipping. Occasional glissading, with legs and arms in the air, added to the merriment of those not at that moment indulging in these involuntary sporting activities.

This last night was also cold and windy, but it was the least unfavourable of the three nights on the mountain. I wore three pull-overs as well as a thick leather jacket and an overcoat, and was cold. Owing to cloud and fog on the last two nights, movement on a featureless mountainside was fraught with danger, and it was with considerable relief when descending that we reached the clearer atmosphere below.

Generally we noticed that *Ceramica pisi* (L.) was everywhere much brighter than the Southern form, a beautiful insect, that the black form of *A. monoglypha* was not uncommon, and that *E. adusta* was large and very variable, with lovely dark forms.

So now we are planning our next visit in July, 1956.

Vallins collected the Trichoptera from the Underscar M.V. trap, and 18 species, mostly frequenters of mountain streams, were recorded.

The following is a list of the Macrolepidoptera and some of the Microlepidoptera noted, and a list of the Trichoptera and Coleoptera taken. I am indebted to Miss C. M. F. von Hayek and Mr. F. D. Buck for identifying the Coleoptera, and Messrs. D. E. Kimmins and A. E. Gardner for working on the Trichoptera.

LEPIDOPTERA

	Underscar Keswick	Wrynose Pass	Windermere Lakeside	Meathop Moss	Moorland nr. Kendal
Coenonympha tullia (Mull.).				■	
C. pamphilus (L.).				*	*
Laothoe populi (L.).	*				
Deilephila elpenor (L.).	*		*		
Pheosia tremula (C.).	*				
P. gnoma (Fab.).	*	*			
Notodonta ziczac (L.).	*		■		
N. dromedarius (L.).	*				
Lophopteryx camelina (L.).	*		*		
Pterostoma palpina (L.).	*				
Phalera bucephala (L.).	*				
Habrosyne derasa (L.).			*		
Tethea duplaris (L.).	■				
T. fluctuosa (Hübn.).			*		
Lasiocampa quercus (L.). (larvae)					*

	Underscar Keswick	Wrynose Pass	Windermere Lakeside	Meathop Moss	Moorland nr. Kendal
Macrothylacia rubi (L.). (larvae)					*
Philudoria potatoria (L.).	*				
Saturnia pavonia (L.). (larvae)					*
Drepana falcataria (L.).	*				
Cilix glaucata (Scop.).	*				
Arctia caja (L.).	*				
Spilosoma lubricipeda (L.).	*				
S. lutea (Hufn.).	*		*		
Diacrisia sannio (L.).				*	
Nudaria mundana (L.).			*		*
Apatele leporina (L.).	*				
A. megacephala (Schiff.).	*		*		
A. psi (L.).	*				
A. rumicis (L.)	*				
Craniophora ligustri (Schiff.).	*				
Agrotis exclamationis (L.).	*	*	*		
Lycophotia strigula (Thunb.).	*	*	*	*	*
Ammogrotis lucernea (L.).		*			
Amathes baja (Schiff.).	*				
A. c-nigrum (L.).	*				
A. triangulum (Hufn.).	*	*	*		
Diarsia brunnea (Schiff.).	*		*		
D. festiva (Schiff.).	*	*	*		
D. rubi (View.).	*		*		
Ochropleura plecta (L.).	*	*	*		
Axylia putris (L.).	*				
Anaplectoides prasina (Schiff.).	*				
Triphaena pronuba (L.).	*	*	*		
Lampra fimbriata (Schreb.).	*				
Polia nebulosa (Hufn.).	*		*		
Mamestra brassicae (L.).	*				
Melanchra persicariae (L.).	*				
Ceramica pisi (L.).	*	*			
Diataraxia oleracea (L.).	*	*			
Hadena thalassina (Hufn.).	*				
H. dentina Esp. (nana (Hufn.)).	*				
H. bicruris (Hufn.).	*				
Eumichtis adusta (Esp.).	*	*	*		
Thalpophila matura (Hufn.).	*				
Procus latruncula (Schiff.).	*		*		
P. fasciunculs (Haw.).	*				
Apamea obscura (Haw.).	*	*	*		
A. basilinea (Schiff.).		*			
A. secalis (L.).	*				
A. rurea (Fabr.).	*	*	*		
A. monoglypha (Hufn.).	*	*	*		
Euplexia lucipara (L.).	*	*	*		
Leucania pallens (L.).	*				
L. lythargyria (Esp.).	*				
Caradrina blanda (Schiff.).	*				
C. alsines (Brahm.).	*		*		
Petilampa minima (Haw.).	*				
Rusina umbratica (Goeze).	*				
Polychrisia moneta (Fabr.).	*				
Plusia chrysitis (L.).	*		*		
P. bractea (Schiff.).	*				

	Under-scar Keswick	Wrynose Pass	Winder-mere Lakeside	Meathop Moss	Moor-land nr. Kendal
P. festucae (L.).	*		*		
P. iota (L.).	*				
P. pulchrina (Haw.).	*		*		
P. interrogationis (L.).	*		*		
Abrostola tripartita (Hufn.).	*				
Zanclognatha tarsipennalis (Treits.).	*		*		
Z. grisealis (Hübn.).	*		*		
Hypena proboscidalis (L.).	*				
Schrankia costaestrigalis Steph.			*		
Pseudoterpna pruinata (Hufn.).	*				
Hipparchus papilionaria (L.).	*				
Sterrha virgularia (Hübn.).	*				
S. inornata (Haw.).	*				
S. aversata (L.).	*		*		
S. biselata (Hufn.).	*		*		
S. ternata (Schrank).				*	
Anaitis plagiata (L.).	*				
Lygris mellinata (Fabr.).	*				
Cidaria fulvata (Forst.).	*		*		
Electrophaes corylata (Thunb.).	*				
Thera firmata (Hübn.).	*				
Xanthorhoë munitata (Hübn.).	*	*			
X. designata (Hufn.).	*	*			
X. montanata (Schiff.).	*		*		
X. fluctuata (L.).	*		*		
Calostigia pectinaria (Knoch).	*	*			
C. salicata (Hübn.).	*	*			
Ortholitha plumbaria (Fabr.).	*				
Venusia cambrica Curt.	*	*	*		
Hydrelia flammeolaria (Hufn.).	*				
P. albulata (Schiff.).	*	*			*
Epirrhoe sociata (Borck.).	*			*	*
E. tristata (L.).					*
Euphyia bilineata (L.).	*				
Lyncometra ocellata (L.).	*				
Perizoma affinitata (Steph.).	*		*		
P. alchemillata (L.).	*				
P. flavofasciata (Thunb.).	*				
Perizoma albulata (Schiff.).	*				
Hydriomena furcata (Thunb.).	*		*		
Eupithecia centaureata (Schiff.).	*				
E. pulchellata Steph.	*				
E. laricata Frey	*				
E. nanata (Hübn.).	*	*			
Gymnoscelis pumilata (Hübn.).			*		
Chloroclystis rectangulata (L.).	*		*		
Abraxas sylvata (Scop.).	*				
A. grossulariata (L.).	*				
Lomaspilis marginata (L.).	*	*		*	
Perconia strigillaria (Hübn.).				*	
Bapta temerata (Schiff.).	*				
Cabera pusaria (L.).	*		*		
Ellopia fasciaria (Schiff.).	*		*		
Campaea margaritata (L.).	*		*		
Semiothisa liturata (Clerck.).	*				
Opisthograptis luteoleta (L.).	*		*		

	Underscar Keswick	Wrynose Pass	Windermere Lakeside	Meathop Moss	Moorland nr. Kendal
Biston betularia (L.).	*		*		
Cleora rhomboidaria (Schiff.).	*		*		
C. repandata (L.).	*		*		
Ematurga atomaria (L.).				*	
Bupalus piniarius (L.).	*			*	
Hepialus lupulins (L.).	*				
H. fusconebulosus (D.G.).	*				
Nymphula nympheata (L.).	*				
Mesographe forficalis (L.).	*				
Phycita betulae (Goeze).	*				
Dioryctria abietella (Schiff.).	*				
Aphomia sociella (L.).	*		*		
Crambus pascuellus (L.).	*				
C. pratellus (L.).	*				
C. pinellus (L.).	*				
C. tristellus (Schiff.).	*				
Tortrix viridana L.		*			
Tortrix viburnana (Schiff.).					*
Crephasia incanana Steph.	*				
Argyroploce lacunana (Schiff.).					*

COLEOPTERA

Carabus problematicus s. *gallicus* Géhin	*				
Carabus violaceus v. *sollicitans* Hart	*				
Cychrus caraboides v. *rostratus* (L.).	*				
Abax parallelopipedus (Pil. & Mit.).	*				
Ampedus balteatus L.				*	
Hypnoidus riparius (F.) Skiddaw					
Athous haemorrhoidalis (L.).					*
Corymbites cupreus (F.).					*
Corymbites incanus (Gyll.).				*	*
Agriotes pallidulus (Ill.).			*		*
Dascillus cervinus (L.).	*				
Serica brunnea (L.).	*		*		
Phyllopertha horticola (L.).					*

TRICHOPTERA

	Underscar Keswick	Windermere Lakeside
Phryganea varia Fab.	*	
Glyphotaelius pellucidus (Retz.).	*	
Limnephilus marmoratus Curt.	*	*
L. lunatus Curt.	*	
L. centralis Curt.	*	
L. luridus Curt.	*	
L. sparsus Curt.	*	
Stenophylax stellatus (Curt.).	*	
S. vibex (Curt.).	*	
Silo pallipes (Fabr.).	*	
Lepidostoma hirtum (Fabr.).		*
Odontocerum albicorne (Scop.).	*	
Leptocerus dissimilis Steph.	*	
Oecetis ochracea (Curt.).	*	
Hydropsyche instabilis (Curt.).	*	
Plectrocnemia geniculata McLach.	*	
Holocentropus picicornis (Steph.).	*	
Rhyacophila dorsalis (Curt.).	*	

THE MARSH MOTH. *HYDRILLULA PALUSTRIS* (HUEBNER)

By C. F. RIVERS

In the late Spring, 1954, I set out to investigate the occurrence of *Hydrillula palustris* in the famous Holme Fen in Huntingdonshire. This elusive moth has been known for many years in Wood Walton Fen, which is little more than ten miles from Holme, but the flora of the two fens is significantly different. Edelsten and others (Entomologist 1944) stated that the occurrence of *H. palustris* in England was always associated with the presence of Meadowsweet (*Spiraea ulmaria*) in the locality. A good search on Holme Fen showed *Spiraea ulmaria* to be a rare plant in that area, but despite this unfavourable discovery I decided to continue.

On the 30th May, in the company of Mr. Brian Gardiner, I set up a M.V. lamp-trap on a bridge over the main drain of Holme Fen. The site chosen afforded the maximum coverage of the rather limited variety of low plants in the locality. Our light shone out with what we thought to be a rather forlorn hope whilst we trudged about searching with paraffin-vapour lanterns. The night was cool and clear and a heavy dew formed early. We examined our light trap at 1.30 a.m. B.S.T. (31.5.54) before retiring to the car for food and rest, and found that no *H. palustris* had been captured. In first light of dawn we cleared our moth-trap and were very excited to find a fine fresh male *H. palustris* in the container. We repeated our efforts on the same site on the following Saturday evening with similar weather conditions prevailing. There was again no *H. palustris* in the trap by 1.30 a.m. B.S.T. (7.6.54). Shortly after this time, when we were fortunately settled in my car, a freak storm hit the area. It is to be regretted that we had no way of recording the details of the storm at Holme, but in the nearby village of Broughton two inches of rain fell in 1½ hours, and there was severe flooding. The daily press reported a snow storm as occurring at the same time in Biggleswade. In calmer weather at first light we were amazed to find that we had taken another two male *H. palustris* in the M.V. trap. The following Saturday (13th June) was a very wet and cold night, but we again set up our light trap on the bridge at Holme. Very few insects were flying and we took no *H. palustris*. Thinking that it was probably too late for the species we set up our M.V. light trap in a different position on the 20th June. I scythed a large clearing in the midst of an acre of Willow Herb and placed the trap in the centre. It was a cold clear night and very unproductive; the moth trap collected only fifty moths, but in the dawn we found three male *palustris* on the underside of the sheet! By now I had come to regard *Hydrillula palustris* as anything but a rare moth at Holme, and Brian Gardiner and I let one of these males fly about the clearing in the early light so that we might recog-

nize the insect's flight in future. The flight is slow and direct and we agreed with a previous observation that it was rather like a Zygaeniid. We did not observe the body to be hanging down markedly as had been previously recorded.

Several interesting points arise from my observation. Firstly, it is obvious that the occurrence of *H. palustris* at Holme Fen is associated with plants other than *Spiraea ulmaria.* The time of flight, viz., after 1.30 a.m. B.S.T., agrees with previous observations of this species, but I was unable to draw any conclusions as to the most suitable weather condition favouring the flight. The dates of capture agree with the earliest and latest records for this moth and it would thus seem that the adult is on the wing for at least one month of the year. Three of the captures were made by the Robinson type M.V. lamp when no moths were found outside the trap. Yet on the 20th June, all three captures were made from the sheet and no *H. palustris* were inside the trap. The capture of these six male insects constitutes a new record for Holme Fen, once famous for such prizes as *dispar* L., *Caenophila subrosoa* (Steph.) and *Laelia coenosa* (Hueb.).

A NOTABLE ABERRATION *POLIA PERSICARIAE* L. (LEP: CARADRINIDAE)

On 10th July, 1954, I took, in my M/V moth trap at Feltham, Middlesex, a specimen of the White Dot Moth, *P.persicariae,* which appears to be referable to *ab. ochrorenis* of Kardakoff (1928; *Ent. Mitt. Dahlem.,* **17**: 419), (in Seitz; Macrolepidoptera of the World, English edition, vol. 3 supplement, 1931—page 100, this is quoted incorrectly as *ochrorensis*).

Kardakoff described this form from the Ussuri region. It is said to have the stigmata obscured and yellow instead of white.

The Feltham specimen (evidently the first specimen of this form to be taken in Britain), whilst agreeing with the description as far as it goes has *all* white replaced by yellow. This gives the underside in particular a very yellow appearance and considerably darkens the upperside.

Lempke (1940; *Tijd. v. Ent.,* **83**: 241) notices several Dutch specimens of '*ochrorenis*', but whether these and/or the Feltham specimen are identical with the Type specimen I am unable to say as I have not been able to see the latter—which I believe to be in the Bytinski-Salz collection at Tel-Aviv.

It would appear that this form must be of very rare occurrence as it is conspicuous in appearance and would surely have been noted if seen.

The Feltham specimen has been given to the Rothschild-Cockayne-Kettlewell collection at Tring.

E. W. CLASSEY.

REARING *ANTITYPE XANTHOMISTA* (HUBN.) (BLACK-BANDED MOTH)

By JOHN E. KNIGHT, F.R.E.S.

This account is not one of success, but it may contain points of interest. Ova of *Antitype xanthomista* (Hübn.) were laid at the end of September, 1953, by females taken in Pembrokeshire (see *Ent. Gaz.* **5**: p. 109). They were kept throughout the winter in a sunless shed and hatched from the 7th to 11th of May, 1954. The larvae were given the flowers and leaves of garden Thrift, both of which were eaten. While still very young a number were distributed among friends. On 13th May, I separated the remainder into groups for different treatment as follows:—(a) sleeved out on growing plant of Thrift, (b) sleeved out on Sallow, (c) kept in breeding cage with Dock, Thrift, Sorrel and Valerian flowers, (d) as (c), but with Sallow only.

Groups (c) and (d) were kept under observation. Progress was slow but apparently satisfactory until the last instar was reached. Then the larvae started dying and all in these groups perished miserably. Group (b) similarly failed. I sent some of the corpses to Dr. K. M. Smith, of Cambridge, who very kindly determined the cause of death as a polyhedral virus infection.

Group (a) was untouched till June, when the plant was dug up and carefully torn to pieces. I found two pupae amongst the tangle of Thrift stems, not in the roots; one of these I damaged and the other produced a male moth on the 10th September. This sleeve was badly holed round the base, and it might be that a number of larvae escaped prior to pupation.

Exceedingly poor as were my own results, three of my friends were even more unfortunate in that they did not succeed in rearing even a single specimen. But by way of contrast two others achieved almost 100 per cent success.

Mr. F. H. Lyon, F.R.E.S., of Tiverton, Devon, wrote to me saying that he found *xanthomista* exceedingly easy to rear. Being away from home (in Scotland) at the time, he kept the larvae in a 2lb. glass jam jar and fed them entirely on Sallow. When full-grown he moved them to a larger cage, with sand and garden soil, wherein they pupated. From 12 larvae he obtained 8 good specimens and 2 cripples, 18th September to 2nd October.

Mr. G. V. Day, of Stoke Ferry, Norfolk, gave his larvae more elaborate treatment. He provided them with Thrift flowers, Harebell, Rock Companula, a garden variety of Selene and Knot-grass; all of which were eaten. After the first change of food-plant they were given Knot-grass only. He observed only two casualties during the larval stage. No pupae died, and emergence was satisfactory. He obtained two pairings without difficulty and eggs were deposited.

Confirming my own observations, Mr. Day says that the larvae fed at night and spent the day resting on a stalk or midrib of the food-plant, not under the stones provided; nor did he notice any tendency for pupation to take place *under* stones as recorded in *Ent. Rec.* **7**: 206.

I made no note of the dates of despatch, but it would seem that my stock became infected after Messrs. Lyon and Day received theirs and before the other lots were sent off. But this does not explain my partial success with those sleeved on Thrift.

During the first instar my larvae were pale greenish, purple or yellowish according to their pabulum, their skin being translucent. They were active during the daytime and geometer-like in behaviour. After the first week they remained motionless during the day and fed only at night. During the 2nd instar those on Thrift bored into the flower-heads and resembled 'Pug' larvae. These contracted a pinkish tint, while those that fed on the foliage exactly matched the leaves. They were half-grown by early June, green with yellow spiracular stripe, elongate and most cryptic. Flowers of Thrift, Pink Valerian, Dock and Sorrel were preferred, though the leaves of the last two were eaten. Those on Sallow only were partial to the young leaves and stems. At the beginning of July apparently full-grown they were pinkish-brown, and it was at this stage that the majority of deaths occurred.

A FEW MIDDLESEX RECORDS OF INTERESTING MACROLEPIDOPTERA

During 1954 a number of interesting macrolepidoptera were taken in my M/V moth trap in Feltham, Middlesex, some of which have already been recorded. The following are of interest in themselves or as Middlesex records. The specimens have been given to the Rothschild-Cockayne-Kettlewell collection.

Sphinx ligustri L., a remarkable specimen on 24th June, with the pink on the hindwings replaced by grey, and the forewings sooty black; the pink persists on the body. *Earias clorana* L., a few specimens only, during June; this insect occurs each year in small numbers. *Agrotis exclamationis* L., a halved gynandromorph taken on 24th June. *Spaelotis ravida* Hübn., one specimen (a male) on 23rd August. *Heliophobus albicolon* Hübn., one specimen, 23rd June. *Eremobia ochroleuca* Esp., one specimen, 15th August. *Aporophyla lutulenta* Borkh., one specimen, 29th September (usually commoner than this would indicate—but 1954 was a very poor year generally speaking). *Parastichtis suspecta* Hübn., one specimen, 3rd August. *Cucullia absinthii* L., a number of specimens in July. *Plusia festucae* L., one specimen, 4th October.

E. W. CLASSEY.

BOX HILL AND FIELD NATURALISTS

By JOHN SANKEY

Juniper Hall Field Centre, Dorking, Surrey

Most entomologists in the south-east of England have heard of Box Hill. It is a famous collecting area, not only for insects but for other creatures and plants as well. To me its interests are not the rare specimens which I could collect to honour my cabinet drawers, nor the enrichment of my herbarium with uncommon plants—I would much prefer to see their photographs anyway—but the variety and richness of all the animal and plant life of this district. There are many species of insect, and this is not surprising when we are told that about three quarters of all known animals are insects; at Box Hill the insects can be studied in the field in close relationship with the rocks, soils and plants and other animals—in short, here is an excellent place to study ecology.

This, I think, is why an area like Box Hill offers such unique opportunities to the entomologist if he is prepared to fill his note-book with observations instead of his cabinet with specimens and to broaden his outlook a little. Please do not misunderstand me, I am not an anti-collector, a certain amount of collecting is necessary, but I feel that enough purposeless collecting has been done and the time has come to turn our attention to making some really useful contributions to science. Much of our knowledge of field biology has been worked out by amateur naturalists—surely this is a tradition worth following?

If the collecting instinct is so deeply ingrained as to be impossible to suppress—and I believe it often is—then there is still plenty of scope for useful spade work in such groups as the Hemiptera, Hymenoptera and Diptera and some of the 'lesser orders' of insects to say nothing of the other invertebrate groups like spiders, millipedes and centipedes.

But it is the complexity of animal and plant life which fascinates me—the relationship of species to species and of species to other factors affecting their lives—the rocks, soils, plants and so on. Why has Box Hill so many interesting species of insects, why is the bug *Gonocerus acuteangulatus* only found here and why is the spider *Hyptiotes paradoxus* almost unknown in other parts of the country? The answer is—we don't know! Then how can we find out?

Only by careful and painstaking observation and recording will the problem be resolved. By team work amongst naturalists—the accumulation of accurate facts, careful consideration of the relationship between species and species, by comparison with other areas in the country, and by patient research into the biological and historical literature on the district. At the best it seems unlikely that we shall get anything more than a generalized picture. And how to begin?

Authentic records, each with full data, must be kept. A generalized botanical survey of Box Hill has already been made by some students

from Juniper Hall. We now want a zoological survey. There are already many records of the animal life found in the area. Inevitably they are very unevenly distributed in the animal kingdom. Insects naturally figure largest. And here the amateur naturalist can make a useful contribution. Juniper Hall is prepared to act as a central record house for the fauna (and flora) of Box Hill. Many contributions to the knowledge of animal and plant life of the area have already been made by naturalists who have worked here. We want more of them. At present there is a crying need for workers interested in spiders, Hymenoptera and Diptera to mention only three of the comparatively larger 'neglected' groups.

We can not yet offer to our visitors all the facilities we would really wish, but all keen naturalists are welcome. We have a library, laboratory facilities including microscopes, and we can offer you hospitality and a warm welcome—and, a very important thing—a first class field area rich in plant and animal life which is a real pleasure to visit.

HERSE CONVOLVULI (L.) IN THE BARNSLEY DISTRICT

A Convolvolus Hawk Moth was taken in the Wombwell district on 5th October, 1954, and was brought to me for identification. Capt. Dannreuther of the Immigration Committee informs me that it was the first reported to him. Other interesting specimens taken include *Deilephila elpenor* (L.), the lower left-hand wing of which is a pleasing buff colour, the right-hand the usual rose tint. I also took a variety of *Lycaena phlaeas* (L.), the upper and lower right-hand wings being coloured cream referable to var. *Schmidtii*, the left wings being the usual colour. J. HUDSON.

69 Milton Street,
Wombwell, Barnsley.

CUCULLIA ABSINTHII (L.) AND *ENNOMOS AUTUMNARIA* WERNB., IN KENT

On 24th September, 1954, I found a full-fed larvae of *Cucullia absinthii* on *Artemisia vulgaris* (Mugwort). I have had no larvae of this species this season and those bred in past years were reared on *A. absinthium* (Wormwood), having refused to eat *A. vulgaris*.

Taken in a M.V. trap in my garden on the night of the 18th-19th September, 1954, were a ♂ and ♀ *Ennomos autumnaria* and a week later another ♂. All these were larger and much lighter in colour than any I had bred in the past. T. J. HONEYBOURNE.

97 Birchwood Road,
Wilmington,
Dartford, Kent.

ON SOME PARASITIC *DIPTERA* AND *HYMENOPTERA* BRED FROM *LEPIDOPTEROUS* HOSTS

PART II

MISC. RECORDS OF PHORIDAE, LARVAEVORIDAE (DIPT.), BRACONIDAE, ICHNEUMONIDAE, AND EULOPHIDAE (HYM.)

By H. E. HAMMOND, F.R.E.S., AND KENNETH G. V. SMITH, M.I.BIOL., F.R.E.S.

Points raised by correspondents relating to Part I of this paper (Hammond and Smith, 1953) are worthy of further comment. Apparently feral males of *Alomya debellator* F. (*op. cit.* 278) are rarely taken. Dr. C. D. Day informs us (*in litt.*) that he has only ever taken one male, and that Dr. Haines used to think the females thirty to forty times commoner than the males. Mr. G. J. Kerrich points out that *A. debellator* is usually associated with soil-dwelling Lepidoptera, and that our record from *Plusia gamma* L. should if possible be repeated so that it can be placed beyond all doubt. We have parasitised *P. gamma* material in hand and it is hoped that this interesting record can eventually be confirmed.

Anilastus tricolor Ratz. (*op. cit.* 278) is given as *Casinaria vidua* Grvst. in Kloet and Hincks (1945: 272). For information on this species we are indebted to Mr. G. J. Kerrich, who writes 'Mr. J. F. Perkins discovered the correct determination. Previously it had been misidentified as *Casinaria* (or *Trophocampa*) *vidua*'. *A. tricolor* is a regular parasite of *Abraxus grossulariata* L.

The following records are of material named since our last paper was published; an asterisk (*) denotes new host records.

DIPTERA

PHORIDAE

Megaselia rufipes Mg. Two males bred in October, 1950, from a larva of * *Anepia irregularis* Hufn., Norfolk, G. M. Haggett. The host larva was found on *Silene otites* Sm., and the *Megaselia* emerged during September. Mr. C. N. Colyer (*in litt*) says that this species is by now a well known facultative parasite, in addition to being generally polyphagous. For a discussion on the habits of this species see Colyer (1950: 321). As true parasitism is rare among Phoridae, accurate data is essential. A figure of the pupa of *Megaselia rufipes* is given (Fig. 1), as an example of the Phorid type, to assist breeders in identifying these, so that any interesting records will not be neglected.

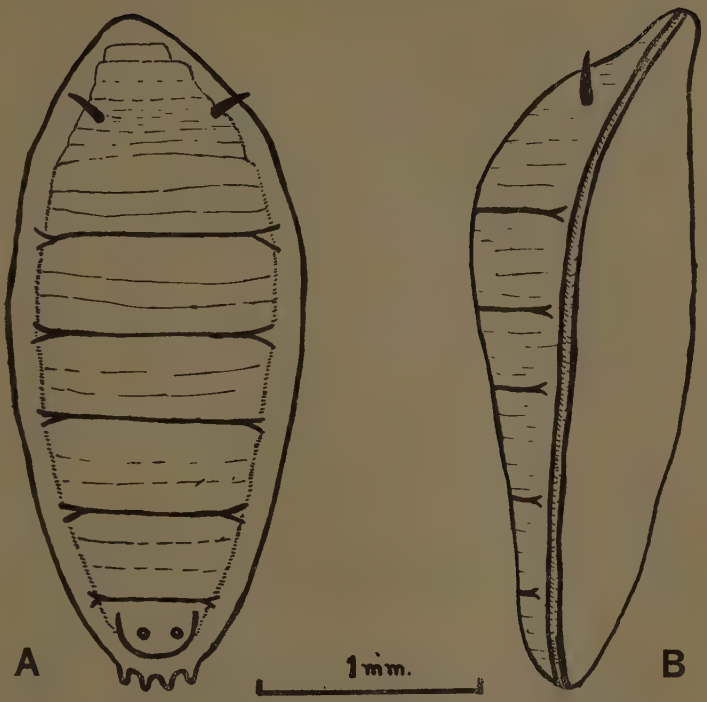


Fig. 1. Puparium of *Megaselia rufipes* Mg. A, ventral; B, lateral. (Camera lucida drawing.)

LARVAEVORIDAE

Nilea (*Pales*) *pavida* (Meig.). One fly bred 24/vii/53 from a larva of *Zygaena filipendulae* L., Warwickshire, (mixed batch from several localities), W. Bowater. For an interesting discussion on the parasites of this species see the paper by the late Prof. G. D. Hale-Carpenter (1945). Three flies bred 16/ix/50, one per host pupa of *Gonodontis bidentata* Clk., Warwickshire, W. Bowater.

Eumea (*Exorista*) *westermanni* (Zett.). Five females bred, one per host larva, 12-19/vi/52 from * *Cosmia pyralina* L. Host larvae on *Ulmus campestris* L., Pulborough, Sussex, A. J. Wightman. The *Eumea* larvae pupated 1-3/vi/52. This is the first Larvaevorid to be bred from this species, though certain Hymenoptera are recorded. *Eumea westermanni* Zett., has previously been bred from *Cosmia affinis* L., (*vide* Audcent, 1942) and *Eurrhypara hortulata* L. (Audcent, *mss.* amendment to his 1942 paper).

Eumea (*Exorista*) *hortulana* (Mg.). Seven females bred 20-26/vi/52, two to three per host larva of *Apatele psi* L., Wolverhampton, Staffs. (K.G.V.S.). The *Eumea* larva emerged and pupated on 29/viii/51. This is a common parasite of *A. psi*.

Pseudoperichaeta insidiosa (R-D.). One female bred, 30/vi/52 ex. pupa of * *Cacoecia oporana* L., (*podana* Scop.) from an orchard in Cheshire. One male bred July 1952 ex. * *Cacoecia lecheana* L., from the same locality (K.G.V.S.). *P. insidiosa* has previously been bred from *Cacoecia crataegana* Hb., *C. pronubana* Hb. and *C. rosana* L., so it is not surprising that the present two species should also be hosts.

Cyzenis (*Monochaeta*) *albicans* (Fln.). From 327 larvae of *Operophtera brumata* L., collected from orchards in Cheshire, 22 larvae of this species emerged and pupated. Five flies emerged 1-5/v/52 (K.G.V.S.).

Phryxe longicauda Wrt. One male bred from * *Celastrina argiolus* L., by Dr. D. W. Empson. Unfortunately no emergence data were noted.

Blepharidopsis nemea Mg. Seven males bred 17-20/vi/51 from * *Operophtera brumata* L., Wolverhampton, Staffs. One to three per host (K.G.V.S.). Three males bred 13-16/vi/51 from one larva of *Abraxus grossulariata* L., on *Euonymus japonicus* Birmingham (H.E.H.). The parasite larvae emerged and pupated 29/v/51. Many bred 7/vii/51 from larvae of *Abraxus grossulariata* L., on black currant, Birmingham, G. B. Manly. There are also two females in the N.A.A.S. collection at Wolverhampton labelled 'Old Trafford, Manchester, 1926, ex. *A. grossulariata* L., J. R. Wilson'. One male in the N.A.A.S. collection at Wolverhampton is labelled 'Wisbech, Cambridge, 1926, ex. *Vanessa urticae*, J. R. Wilson'. This species is not recorded in Audcent (1942), but Hamm (1942) records it. One female bred in September, 1953, from * *Hypena rostralis* L. Host larva on *Humulus lupulus* L.; Tunbridge Wells, Kent, H. T. King. The parasite pupated 8/viii/53. This appears to be the first tachinid bred from any of the Snout moths.

Carcelia excisa (Fln.). Two flies bred from * *Abraxus sylvata* Scop., one per host. Unfortunately the date of emergence is not available due to absence when this took place, but it was well after the normal emergence time of the moth. The host larvae were collected on *Ulmus glabra*, Wrekin, Salop, 8/ix/53. (K.G.V.S.). The *Carcelia* larvae emerged from the host pupae through a small exit hole made in the side, and pupated. *C. excisa* is seldom taken wild and is probably a local species in its distribution. Only two other parasites have been bred from *A. sylvata*, these are *Bactromyia* (*Erycia*) *aurulenta* Mg., and *Carcelia rutilla* Rd. All these species are rare and probably met with more frequently by breeding. A discrepancy in the literature encountered while determining this species is worthy of note.

Carcelia rutilla has two postero-ventral bristles on the fore tibia, but *C. excisa* has only one. Day (1948) and Wainwright (1928) include *rutilla* in the group with abdominal discal bristles, but Lundbeck (1927: 381) says 'No real discal bristles, at most some stronger hairs'. Lundbeck (*op. cit.*: 381-2) also comments on a specimen of *C. rutilla* with only one postero-ventral bristle on the fore tibia, which would of course key out to *excisa*. Wainwright (*op. cit.*: 181) comments on the variability of species within this difficult genus, but he maintains that two species are clearly defined, i.e., *rutilla* and *excisa*. From the above discussion, however, it is apparent that care must be taken when separating these two species, and that where possible a detailed description should be consulted or reliably named material examined. Dr. C. D. Day kindly confirmed the determination of *C. excisa*.

Carcelia comata (Rond.). Many bred, mid June, 1954, 3 to 4 per host, from *Arctia caja* L., Southampton, R. W. Watson.

Winthemia quadripustulata (Fab.). Six flies bred 30/vi/52 from a larva of * *Gortyna flavago* Schiff. in *Arctium lappa* L. stem, near Salisbury, Wilts., (H.E.H.). The *Winthemia* larvae emerged from the putrified host and pupated 11-15/vi/52.

Nemorilla floralis (Fln.). One male bred 10/ix/50 from * *Hadena lepida* Esp. The parasitic larva emerged from the host pupa and pupated outside. The host larva was found on *Silene cucubalus*, Doncaster, Yorks., G. E. Hyde.

Compsilura concinnata (Mg.). One female bred 28/viii/51 from a larva of * *Smerinthus ocellatus* L., on apple, Chiswick, London, R. W. J. Uffen. A new host record is never surprising with this species since it has been bred from over 70 species of Lepidoptera.

Crocuta (*Bucentes*) *cristata* Fab. Twelve flies bred 9-25/vi/52 from one host larva of * *Diataraxia oleracea* L., on *Calendula*, Southampton (H.E.H.). The *Crocuta* larvae emerged from the host and pupated 25/8/51. One fly bred in June, 1951, from a pupa of * *Smerinthus ocellata* L., West London, R. W. J. Uffen. Ten Larvaevorid pupae came from the one host larva. Two were of *Crocuta* size, from which the single fly emerged, but the other eight were much smaller and definitely of another species. It is unfortunate that no adults emerged, as this would have been an interesting record, though of course such cases have occurred before. Parasitic Diptera that over-winter as pupae are notoriously difficult to breed under laboratory conditions, the mortality rate being very high in spite of careful attempts to create suitable conditions. One fly bred from * *Caradrina morpheus* Hufn., Birmingham, Warwicks. (H.E.H.). The *Crocuta* larvae emerged from a single host larva and pupated 27/ix/50, the adults emerged 7/vi/51. This is the first Larvaevorid recorded from *C. morpheus*.

Actia bicolor (Mg.). Two flies bred in June, 1954, from a larva of *Lasiocampa quercus* L. on sallow, near Portsmouth, Hants., R. W. Watson. The *Actia* larvae emerged and pupated 9/vi/53. Day (1948: 77) notes this species as scarce (Midlands and Scotland) and this southern record is therefore of considerable interest.

Athrycia (*Voria*) *trepida* Mg., var. *curviventris* Zett. One fly bred 26/v/51 from a larva of *Orthosia gracilis* Schiff. found on *Spirea*, West Sussex (H.E.H.). Three puparia were formed 4/vii/50 in the *Orthosia* larval skin, but only the one fly emerged.

Voria ruralis Fln. One fly bred in June, 1950, from *Plusia chrysitis* L., Mundford, Norfolk, G. M. Hagget.

Wagneria lentis Mg. One male bred 16/iii/50 from a larva of *Amathes xanthographa* Schiff., Birmingham (H.E.H.). *Wagneria lentis* was first recorded from this host in Part I of this paper (Hammond and Smith, 1953). This second record from a different locality suggests that it may be a regular parasite of this species.

Thelaira leucozona Pz., (*nigripes* Fab.). Thirty-six flies bred from larvae of *Arctia caja* L., averaged five per host; Portsmouth, Hants., R. W. Watson. Parasite larvae emerged and pupated 8/vi/53, flies emerged 2-8/vii/53.

Blepharomyia amplicornis Zett. One male bred 19/v/51 from * *Erannis defoliaria* Cl., on oak at Beaulieu, Hants, (H.E.H.). The parasite larva emerged from the host larva and pupated 5/vi/50. *B. amplicornis* has previously been bred from *Erannis marginaria* Fab., and *Bapta temerata* Schiff. (Audcent 1942: 12). Prof. O. W. Richards and Dr. N. Waloff (1948) have bred it from *Opisthograptis luteolata* L. This parasite appears to be restricted to Geometrid hosts.

HYMENOPTERA

BRACONIDAE

Apanteles tetricus Rein. Three females bred in June, 1950, from a larva of *Maniola jurtina* L., Radford, Notts. (H.E.H.). The *Apanteles* larvae emerged from the host's body and spun cocoons on 10/v/50.

Apanteles melitaearum Wilk. Many males bred 13-16/v/50 from larvae of *Euphydryas aurinia* Rott., North Kent (H.E.H.).

Apanteles cajae (Bouché). Females bred 2/v/44 from nine cocoons ex. larvae of *Arctia caja* L., Birmingham (H.E.H.).

Apanteles popularis (Hal.) (*det.* G. E. J. Nixon). Several bred from larvae of *Callimorpha jacobaca* L., Ascot, Berks., by Miss M. E. K. Megaw. Unfortunately no emergence data are available.

Apanteles vitripennis (Curt.). One female bred 2/ii/44 from a larva of * *Amathes xanthographa* Schiff., Birmingham (H.E.H.). Four *Apanteles* larvae emerged from the one host and spun cocoons, but only one produced an adult.

Apanteles fulvipes (Hal.). One male and three females bred 2/v/50 from a larva of * *Caradrina alsines* Brahm., Birmingham (H.E.H.).

Apanteles lacteicolor Vier. One female bred 27/vii/50 from a larva of * *Apatele megacephala* Schiff., Birmingham (H.E.H.). The *Apanteles* larva emerged while the host larva was in its second instar on 16/vii/50. This species is not included in Kloet and Hincks (1945: 232), but is dealt with by Wilkinson (1945: 203 *et. seq.*).

Microplitis viduus (Ruthe). One male bred 10/vii/50 from a larva of * *Euplagia quadripunctaria* Poda found on various low plants, South Devon, T. J. Honeybourne. The *Microplitis* larva emerged and pupated 20/v/50.

ICHNEUMONIDAE

Listrodromus nycthemerus (Grav.). One female bred from *Celastrina argiolus* L., by E. W. Classey in 1935.

Callajoppa exaltatoria (Panz.) (*det.* K. G. V. Smith). One male bred 1/vii/54 from a pupa of *Sphinx ligustri* L. Host larva found on *Ligustrum vulgare* L., Pulborough, Sussex, G. E. L. Manley.

Cratichneumon gravenhorsti (Fons.) (*albifrons* Steph.). One male bred 2/vi/42 from * *Gonodontis bidentata* Clk., Birmingham (H.E.H.).

Ctenichneumon panzeri (Wesm.) (*det.* G. J. Kerrich). One female bred 4/vi/54 from a pupa of *Agrotis segetum* Schf., Wellington, Salop, H. C. F. Newton.

Amblyteles armatorius (Forst.) (*det.* K. G. V. Smith). One female bred 21/vi/42 and one female 15/v/53, each from pupae, one per host, of *Agrotis segetum* Schf., Birmingham (H.E.H.). Four males bred in July, 1951, one per host pupa of *Melanchra* (*Mamestra*) *persicariae* L., Walsall, Staffs., E. A. B. Stanton.

Amblyteles palliatorius (Grav.). One female bred 17/vi/47 from * *Citria lutea* Strom., Warwickshire (H.E.H.).

Banchus femoralis Thoms. One female bred 3/iii/40 from * *Trigonophora flammea* Esp., Birmingham, G. B. Manly.

Banchus volutatorius L., one male bred 10/vii/41 from * *Mamestra brassicae* L., Birmingham (H.E.H.).

EULOPHIDAE

Chrysocaris sp. (*det.* G. J. Kerrich). From many larvae of * *Lithocolletis mespilella* Hübn. (= *torminella* Frey) (*det.* L. T. Ford) feeding on pear, Wolverhampton, Staffs. 52 successfully spun cocoons. On 12/12/51 these were dissected and 4 contained *Chrysocaris* pupae as follows:—2 cocoons with 2 parasite pupae in each, and 2 cocoons each with 3 parasite pupae. These pupae all produced adults during the first week of February, 1952 (K.G.V.S.). The only other parasite recorded from this species is *Microbracon variegator* Spin. (*vide* Morley and Rait-Smith, 1933).

ACKNOWLEDGMENTS

Once again we would like to thank all our correspondents for sending us parasitised material. Our best thanks are also due to the late H. Britten for determinations of Hymenoptera, and to Dr. C. D. Day for his opinions on certain species in the *Phryxe-Carcelia-Exorista* complex.

Due to the death of Mr. Britten the parasite collection will remain in our hands, but eventually it is hoped to present this to some suitable institution, where it will be available to other workers.

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H. E. HAMMOND,
16 Elton Grove,
Acocks Green,
Birmingham 27.

K. G. V. SMITH,
Hope Dept. of Entomology,
University Museum,
Oxford.

APATURA IRIS IMAGO ATTACKED BY BIRDS: With some observations on the status and future of this species

By I. R. P. HESLOP, M.A., F.R.E.S.

In July of this year (1954) two male specimens of the Purple Emperor (*Apatura iris* Linn.) were observed for some time by my wife and myself on and about one oak tree. During a cloudy spell they became quiescent and settled down among the foliage, where they became invisible to us, though we knew exactly where they were. A Jay was then seen to fly straight to the position of one of these butterflies, which thereupon tumbled out of the tree in a great hurry and made off. The Jay then transferred its attentions to the other individual, and for several seconds could be seen pecking and gobbling. This specimen was not seen again, and there is no doubt that it was eaten.

On the next visit a few days later I put an old and rather poorly set male specimen of *iris* on a tree-stump in a ride of the wood. After a few minutes a Jay descended to the specimen, but saw me and flew off. It returned once again about an hour later with the same result. On the following day I placed the set specimen as before, but in a different site. I then concealed myself to watch. After about half-an-hour a Jay flew down, picked up the pinned specimen and alighted with it on the ground, where it proceeded to peck it. The bird must, however, have perceived something unusual about its game, since it flew off, leaving the specimen on the ground with the body intact, but with both hind-wings detached and the fore-wings shredded.

With these facts before me, other cognate incidents began to recur to me and to fit into place. There was for example that occasion last year when the local farmer, who knew the species well, came to tell me that he had just seen a Purple Emperor on his manure heap. When I arrived there a few minutes later to find no Emperor, I stored a visual recollection of a Magpie flying off the heap just as I came in view.

In a flash now there came to me an explanation of a fact which has puzzled me all my life.

The literature of the previous century abounds with references to the Purple Emperor's predilection for putrid or faecal matter. In fact through this was the recognised way of taking the species. But during the last fifty years there has been a change; and now it is the rarest possible occurrence, even where the species is still numerous, for the Emperor to be observed on matter of this nature, though it is not yet entirely a thing of the past. My own early efforts (until I became aware of the change) after this prize, from 1918 onwards,

were always with bait: and they were entirely without success. How many other entomologists, who had relied on the canon of Edward Newman and even later authors, must say the same!

But this change of habit in the Purple Emperor during the last half-century has coincided exactly with the general and remarkable increase in bird population. And since the First World War, with the decline in keepering, the increase in birds which can be classed as vermin—such as Magpies and Jays—has been especially marked.

A Purple Emperor imbibing of its traditional repast and oblivious to any outside influence—as I myself have observed abroad—is a sitting target for air attack. This would not have mattered so much under old conditions, when suitable ground for the Purple Emperor was far more general than now and the species was in consequence far more common and widespread than it is at present. But now, when its hold may easily turn from uneasy to precarious, the very existence of the species must depend on the development of protection against a menace which itself has increased.

I submit then that the former proclivities of the Purple Emperor to exposure on conspicuous sites, to alightment on low-placed lures, etc., and to comatose settling anywhere, have been and are being bred out of the species by the principle of survival of the fittest.

With the decline in baiting there has been a corresponding increase in beating.

Quite apart from the natural selection indicated, there is a tendency for threatened species to evoke other means of increasing their numbers so as to combat their enemies and other antagonistic circumstances. For example, in some species there may be an adjustment in the sex ratio or a marked increase in the laying capacity. The tenor of the Purple Emperor's reaction may possibly be indicated by its recent and unprecedented tendency towards second-broodedness.

I should observe that Jays and Magpies do not necessarily always attack the Purple Emperor imago as an object of food, but perhaps sometimes from the well-known interest of the Corvidae in articles bright or curious or sparkling or contrastingly-coloured.

The predations of smaller birds on the Purple Emperor larvae have of course long been known. It is attacks on the imago that are a new observation to me, and the basic fact to which I am calling attention.

An allusion made above leads me to reflect how very much this and other species of butterfly owed to old-fashioned game-keeping methods, enlightened in so many instances by the real interest in Natural History of that also disappearing species, the Keeper. Also, quite apart from the fact that such pests as Jay, Magpie and Grey Squirrel (which latter undoubtedly feeds on the pupae) would not be suffered to exist under the old régime, I have known woods where the Purple Emperor or the Black Hairstreak, or both, were regarded as the most precious 'game' that the woods could harbour and were protected accordingly.

Incidentally, is it not high time that the Purple Emperor was provided with a specific and adequate Nature Reserve of its own? I commend the idea to Nature Conservancy with all earnestness. This species has as clear and as deserving a case for its own sanctuary as has the Large Copper for Woodwalton and the Black Hairstreak for Monkswood, and as the Swallowtail had for Wicken. The fact that this project would entail also the preservation, intact, of a portion of our fast-disappearing heritage of Oak woodland need by no means be regarded as a disadvantage or an obstacle. And there are many of us who would be prepared to give our spare time for the rest of our lives to secure the continuance of this glorious insect.

I trust that, if I have done no more, I may at least have helped to show the red light with regard to this species.

'Belfield',
Burnham-on-Sea,
Somerset.
3rd December, 1954.

A NEW LOCALITY FOR THE RARE SPIDER *META BOURNETI* SIMON

Mr. David Tulett, an entomologist who is an enthusiast of 'caving', recently sent me an adult female *Meta bourneti* Simon (Argiopidae) which he had found on the 26th February, in Denny's Hole, near Axbridge in Somerset, at a point normally in almost total darkness some forty feet from the entrance. G. H. Lockett and A. F. Millidge (*British Spiders* 1951-1953, **2**: 119) record this species from only three localities in Suffolk, Gloucestershire and Hertfordshire, where it appears to favour dark, humid habitats. This is its first record as a cave dweller.

The authors of *British Spiders* say that *bourneti* is in size and appearance indistinguishable from *Meta menardi* (Latreille), a widely distributed species which favours cellars and caves. The present specimen, however, is much larger than the usual adult specimen of *menardi* being 16 mm. long, and is devoid of annulations on the legs. Three of the four British species of the genus *Meta* are now known to inhabit caves; the other being *merianae* (Scopoli). The fourth British species *Meta segmentata* (Clerck), which is probably the most abundant orbweb spinner in these islands, seems on the contrary to avoid dark, damp situations preferring a place in the sun on the hedgerow or the gorse common.

A. E. Le Gros.

9 Victoria Avenue,
Wellington, Shropshire.

RECENT LITERATURE

Transactions of the Suffolk Naturalists' Society including the Proceedings of the year 1953. Vol. VIII—part III. Suffolk 1954. pp. lxi-cviii, 109-178. 3 plates. Price 7s. 6d. (corrected in ink from 12s. 6d. as printed).

There is a good deal of interest for entomologists in this volume.

A list of Trypetid Diptera from the collection of the late Claude Morley, with the Suffolk records denoted.

Some very interesting notes on the life and habits of the Digger Wasp *Mellinus arvensis* L.

A comparative survey by Mr. S. Beaufoy of the status of Butterflies in Suffolk today and in the second decade of this century (as recorded in an article by Claude Morley in the *East Anglian Daily Times* for 14th August, 1920).

There are numerous notes, mainly on Lepidoptera, and one by Mr. A. Aston records *Hadena compta* Fab., as new to Suffolk (one specimen taken on 2nd August, 1953, at Polstead). The half tone frontispiece, which illustrates *H. compta,* and *H. conspersa* Esp., for comparison, is ghastly and could with advantage have been omitted.

Some careless editing has led to a few unduly gross errors (such as *Zando-gnathos* for *Zanclognatha* on page 134) but on the whole a well-produced and worth-while volume from a Society with a history of good publishing.

Cheshire, North and Mid-Wales Natural History Vol. V. (Proc. Chester Soc. of Nat. Sci., Lit., and Art.). Chester 1954, pp. 120, 8 plates. Price 15s. in paper covers, 21s. bound in cloth.

The fine standard of these publications is well maintained in this fifth volume; they are of the greatest importance to all who are interested in the British Lepidoptera. As usual the half-tone illustrations of lepidoptera are admirably clear and for this a large share of the credit must go to the photographer, Mr. W. E. Ashworth. The Local Lists of Butterflies and Moths (which include Micro-Lepidoptera) are carefully compiled, and Mr. S. Gordon Smith, who has done such great work in this field for so long, now has the help of many reliable lepidopterists whose names appear as recorders. Some of these records are surprising and one strikes your reviewer as astounding. This is a recent record (1953) of *Nonagria neurica* Hübn., from Nantwich in Cheshire. It was taken from his moth-trap by Mr. J. D. C. Boyes. We know Mr. Boyes as a careful and reliable worker —but can it really be *neurica* or has a worn specimen of *N. dissoluta* Treits., done service for this species, one of the rarest and most localized of our Moths?

Handbooks for the identification of British Insects. Vol. IV, part 8(a) Coleoptera. Staphylinidae. Section (a). Piestinae to Euaesthetinae. By C. E. Tottenham. Pub., R. Ent. Soc. Lond. 1954. pp. 79. 196 figs. Price 15s.

The continued publication of these *Handbooks,* with their much-needed Keys, is a source of great satisfaction to all keen entomologists and particularly to the amateur field worker, who is so often at a loss when it comes to literature-searching (even when facilities exist—which they do not in the vast majority of cases). The work of selection, synthesis and compilation is of the greatest value today, when the literature of entomology is so vast and scattered and, although any particular essay may well be criticized by expert workers in the field covered, the competency of authors who have published in this series to date is of the highest standard. The Rev. C. E. Tottenham is an acknowledged authority on the insects of which he treats in this publication and we have heard enthusiastic comments from amateurs who have had cause to use the Keys for purposes of identification—the acid test of the practical value of the *Handbooks.*

A Key to the Nymphs of British Ephemeroptera. By T. T. Macan, published in '*The Salmon and Trout Magazine*', January, 1955: 59-70.

This key is written for the fisherman and general naturalist who has only a hand-lens to aid vision; it is written in simple terms and includes seventeen clear illustrations. Habitats and characteristics of the living nymphs are used in the key, which generally only aids identification down to generic level.

A.E.G.

BOOK REVIEWS

Megastigmus flies attacking conifer seed. 1954: Forestry Commission Leaflet No. 8, p.p. 10, 6 figs. Price 6d.

Revised by Dr. N. W. Hussey, this leaflet replaces that entitled '*Douglas Fir Seed Fly*', first issued in 1921. Although the British species of *Megastigmus* (Hymenoptera) includes several which are parasitic on the insect inhabitants of oak galls, most attack conifer seed. Both home-grown and imported seed are attacked by the larvae of these minute insects and is rendered useless by the destruction of the kernel. It is considered that four conifer infesting species have been introduced from Western North America since the latter part of the last century. The adult insect is described, figured and a key to species provided. The life-history is described, also the stage of cone-growth suitable for attack and factors which influence infection. The Chalcid parasite *Amblymerus apicalis* Thoms., has recently been found to act to some extent as a control. Chemical and temperature control measures as applied to infected seed are also outlined.

A.E.G.

Catalogue of the Type Species of Microlepidoptera in the British Museum (Natural History) described by Edward Meyrick. By J. F. Gates Clarke. Volume I, pp. 1—332. Frontispiece, 3 pls. 1 text fig. Published by the Trustees of the British Museum (Natural History). Price £3.

This Volume forms the Introduction to a Catalogue which is to be published as a series of six or seven volumes. It is to be an 'Illustrated' Catalogue, a fact omitted from the title; and although Volume I contains only four half-tone plates, subsequent Volumes will probably contain as many plates as pages of text. When completed the Catalogue will provide data on the types and lectotypes of approximately 5,000 of the species of Microlepidoptera described by Edward Meyrick. This number probably represents considerably less than one half of the total number of types of species in the British Museum (Natural History) described by Meyrick, and it should not therefore be assumed from the title that a complete Catalogue can be expected. The types and lectotypes dealt with in the Catalogue will be illustrated by means of half-tone plates of wings and genitalia, and where a species is the type of a genus described by Meyrick additional illustrations of the wing venation and the labial palpi will be given.

American, African, Asiatic and a few Australian species of 23 families will be dealt with in the Catalogue. In Volume I the author has made many modifications in the present classification of the Microlepidoptera, mostly as a direct outcome of this work. One important change is the separation of a large group of Asiatic genera from the GELECHIIDAE to form the new family TIMYRIDAE, of which the type genus is *Timyra* Walker, 1864. In many of the families new generic combinations are introduced or are foreshadowed; in some cases new genera were found to be necessary, though the author states that it is not within the scope of the Catalogue to describe them. Of particular interest, and demonstrating how badly a revision is needed of this group, is the proposed removal of all the species placed by Meyrick in the genus *Argyroploce* (Meyrick *nec* Hubner, 1826) to the genus *Olethreutes* Hubner, 1822, in the family OLETHREUTIDAE.

Due to the arrangement of the Catalogue and the method of presentation in subsequent Volumes, the generally accepted systematic order of the families is not followed, and subfamily divisions are not used. The tentative order in which the families will be dealt with in future Volumes is as follows:—Vol. 2, STENOMIDAE, XYLORYCTIDAE and COPROMORPHIDAE; Vol. 3, TORTRICIDAE, PHALONIIDAE, OLETHREUTIDAE and probably CARPOSINIDAE and CHLIDANOTIDAE; Vols. 4 and 5, GELECHIIDAE, TIMYRIDAE, OECOPHORIDAE, BLASTOBASIDAE and COSMOPTERYIGIDAE; Vol. 6, HYPONOMEUTIDAE, GLYPHIPTERYGIDAE, TINEIDAE and ACRO-

LOPHIDAE; and in one or other of the above Volumes or in an additional Volume the families METACHANDIDAE, ETHMIIDAE, STREPSIMANIDAE, SCYTHRIDIDAE, SCAEOSOPHIDAE and PHYSOPTILIDAE.

The comparatively new family SCHOENOTENIDAE erected by Diakonoff (1952, Zool. Meded. Mus. Leiden, **31**:166) for a small Papuasian group is not mentioned and the genus *Diactenis* Meyrick which Diakonoff reassigned to that family is retained in the TORTRICIDAE. The small family CHLIDANOTIDAE is stated by the author to be confined to the Indian Region, Borneo and Fiji, but it has at least one representative in Africa, for examples of *Trymalitis cataracta* Meyrick have recently been determined from the Belgian Congo.

The Catalogue will be a monumental work of reference for all who study the Microlepidoptera. The specialist will particularly welcome it because it will supply the solutions to many taxonomic problems still facing us. Many of these problems have arisen through Meyrick not indicating types in accordance with the International Rules of Zoological Nomenclature, and through basing his classification too rigidly upon wing venation characters without regard to the morphology of the genitalia and other organs. Progress in the systematics of these groups depended first on a critical re-examination of the type material.

Meyrick's collection of Microlepidoptera is briefly described in the Introduction in Volume I. Of interest is an extract taken from a letter written by Meyrick to Lord Walsingham in 1884, expressing his then poor opinion of the British Museum and its unsuitability for his collecton. However, that letter was written more than fifty years before Meyrick's death in 1938, leaving ample time for him to modify his views, and of course in the meantime Lord Walsingham's famous collecton of Microlepidoptera had come to the British Museum, an event which no doubt greatly influenced Meyrick's final decision. The remainder of the Introduction chiefly concerns the principal sources from where Meyrick obtained his material. His chief contributor of Indian Microlepidoptera was the late T. B. Bainbrigge Fletcher, whose collection has since been presented to the British Museum and contains much valuable material.

A reference is cited (Janse, A.J.T. and Fletcher, T.B., The Moths of South Africa, **4** pt. I, xi-xxiv, 1942) to a bibliography of 420 books and papers published by Meyrick, but we are not told where biographical information might be sought, and only a little that is pertinent to the Catalogue is given.

An integral and important part of Meyrick's collection is his hand written catalogues and note books. These are mostly in bulky ledgers and cover about four feet of shelving in the British Museum. They are listed individually and the contents of each is described. They demonstrate perhaps more than anything else the extraordinarily

methodical manner in which Meyrick worked. Much of the information they contain is unique and could not be replaced and is invaluable to a proper understanding of Meyrick's arrangement of his collection.

A section dealing with labels follows. The frequently abbreviated data on Meyrick's labels is discussed where relevant to the Catalogue. Examples of some of the data labels are figured, as are also the various identification labels used by the author.

Most of Volume I is devoted to a list of 14,199 species of Microlepidoptera described by Meyrick. The species are arranged alphabetically and following each is the genus in which it was described, a reference to the original description and the location of the type when known. The species which are types of genera are indicated by an asterisk. Every effort has been made to make this list as complete and as accurate as possible, and the printers have performed with great skill a task which must have been extremely exacting. The list will be invaluable as it stands, but it would have been of more practical use if the family, and also the country from which each species was described, had been given, since it includes species from so many different zoogeographical regions. Of interest is the wide variety and choice of names used by Meyrick, avoiding such commonplace practices as patrinomial or geographical names, and reflects his classical background.

Volume I is a limited edition of 500 copies, hardly likely to be too many for a work of reference one will expect to find in Entomological libraries or Reference libraries of importance throughout the World, and at the same time sufficient to meet the requirements of individual collectors and specialists of Exotic Microlepidoptera.

The author of this Catalogue is a distinguished Microlepidopterist of the Smithsonian Institution, U.S. National Museum, in Washington, D.C., who has specialised in systematics and taxonomy. He began preparing the Catalogue in the British Museum (Natural History) several years ago, and some idea of the immensity of the task which he undertook, and which we are now beginning to see the results, can perhaps be appreciated from the fact that it involved the preparation of more than 5,000 genitalia dissections for photomicrography, and that more than 12,000 photomicrographs and 6,000 photographs have been taken, and about 500 drawings made of wing venation of type species of genera.

J. D. BRADLEY.

The Physiology of Insect Metamorphosis, by V. B. Wigglesworth, 1954 (Cambridge Monographs in Experimental Biology No. 1). Size 8½in. by 5½in., viii. plus 152 pp., 4 plates, 45 figs. Cambridge University Press, London. Price 12s. 6d.

Few entomologists can fail to be intrigued by the phenomenum of

metamorphosis, yet many will have neither time nor enthusiasm for extensive reading of the relevant original literature. Professor Wigglesworth's new book will serve their needs admirably. Clear, concise and well-written, this little volume provides a stimulating survey of our knowledge of a most important aspect of insect physiology. Furthermore, it is up-to-date (a rare feat nowadays): such important modern work as that of Butenandt and Karlson (1954) on the isolation of crystalline moulting-hormone is covered, and there are several other references to the current literature.

The author adopts as his basis the concept that metamorphosis is but a special case of polymorphism in which the alternative forms are suppressed only temporarily. The humoral nature of this suppression was first demonstrated by his own well-known series of 'parabiosis' experiments on the Hemipteron *Rhodnius prolixus* and, quite naturally, this work forms the main theme of the present book. However, full use is made of evidence available from other sources in the development of the salient arguments.

The book is divided into five chapters entitled: 'Introduction', 'Histological changes during moulting and metamorphosis', 'Physiology of growth and moulting', 'Physiology of metamorphosis', and 'Differentiation and polymorphism'; the last includes an illuminating discussion of the possible rôle of hormones in such phenomena as homoesis and regeneration. There is a comprehensive list of references and the main subject-matter is covered by a small but adequate index.

B. P. MOORE.

Malayan Animal Life, by M. W. F. Tweedie and J. L. Harrison, 1954. Longmans, Green & Co., London. pp.x.237. Frontis. 154 figs. Cloth. Price 18s.

In this book two courageous authors have dealt with the fauna of the Malay States. Anyone who has lived in a tropical country, or who has studied its Natural History, will realise that the task of giving, in a single small volume, even a cross-section of the animals of such a region is beset with great difficulties, as there are so many creatures which appear to have good claims to representation in the book. The problem of selection is formidable, and has, in 'Malayan Animal Life', been very successfully tackled, as sufficient species have been mentioned to represent each group of animals adequately, and to arouse enough interest and desire to be acquainted with more, while avoiding the effect of a mere catalogue.

The book is written in a style which will appeal both to animal lovers and to students who wish to know more of the Wild animals, Birds, Fishes, Reptiles, and 'Creepy-crawlies' which they have seen stuffed, pinned and lifeless in museums. The facts are concisely stated, and all unimportant or irrelevant matters are omitted, which

is a great advantage when quick reference is required. There is an astonishing amount of information given about some of the creatures described, interesting details of habit, life-history, etc., which leave us in no doubt as to the excellent qualifications of the authors. Quite a number of the animals described are familiar to us in this country, which should attract readers here.

The illustrations are all in black and white, beautifully executed, and accurate in detail. It is, perhaps, a pity that some of them could not have been in colour, seeing that animals are so beautifully coloured in the Tropics, but, no doubt, the cost would have been prohibitive. The Frontispiece, a fine photograph of an Agamid Lizard, makes one wonder if the book would not have been the better for a number of photographs of this quality. Other excellent features are the list of corresponding Malay and English names, which must be very valuable to any naturalist visiting the country, the Glossary of biological terms, and not least, a good Index.

This review cannot be ended without some reference to the clear notes on the classification of animals, which are both intelligible and helpful to the reader who has not been a student of Biology, and the precise definition of an animal, given at the end of the Introduction, to mention just one small detail, which should help to clear up the common misunderstanding which causes many people to talk of 'animals *and* insects'!

Altogether, this book should prove a very interesting and useful addition to a Nature library, and is, moreover, of a size easy to carry about.

H.D.S.

Deutscher Entomologentag in Hamburg 1953 Titschak, E., (Ed.). iv + 216 pp., illustrated. Jena, 1954. Paper covers. Price in G.B., £2 2s.

In the years before the last war the late Dr. Walter Horn, the shrewd and genial director of the German Entomological Institute in Berlin, organized a series of meetings which he called Wanderversammlungen. They were both popular and valuable. This meeting, organized by Dr. Titschak at Hamburg in 1953, is clearly an attempt to carry on the Horn tradition. It was attended by some 200 participants who appear to have enjoyed a well organized programme. The volume issued by Dr. Titschak is literally a volume of proceedings in which discussions, exhibitions, excursions and formal communications are interwoven and bear the strong imprint of the organizer. As is usual on such accasions, the papers contributed cover a wide field, yet are mostly rather specialized; some make definite contributions to knowledge, but most are more in the nature of summaries of known facts and opinions. Dr. Magnus, of Tübingen University, describes in two separate papers experiments on *Argynnis paphia*. By

using models of various shapes, sizes and colours, some stationary, others moving, but all designed to simulate or even exaggerate the appeal of a 'calling' female to a searching male, he attempts to analyse the reactions of the male. The work follows rather closely the pattern of similar experiments made by Tinbergen on *Eumenis semele,* and reaches very similar conclusions. In the second experiment, using marked specimens, he assesses the movements of a population of *A. paphia* within a defined area and the fluctuations in the size of the population, by sexes, over a period of some weeks. A paper that will attract the attention of m.v. lamp addicts, only to disappoint them, is contributed by Dr. Clive. Though entitled 'the influence of the wave length of light in light trapping', it is mainly theoretical. The actual experiments consisted of a comparison of the relative 'attractiveness' of two Osram lamps on four nights. The two lamps were the H.W.A., which gives a 'mischlicht' devoid of ultraviolet, and the H.Q.V., described as an ultraviolet lamp. The former attracted 31 specimens, the latter the grand total of 40! The author himself seems to realize that such figures mean nothing; and he appears quite unacquainted with the work of the Robinsons in this country. There is a well illustrated paper on the biology of the strawberry weevil (*Rhynchites germanicus*) by Francke-Grossman; and Dr. Timmerman in an admirable contribution illustrates by examples drawn from his own researches on bird lice of the genus *Quadraceps* the now well known fact that the systematic study of parasites can be relied upon to shed light on the taxonomy of their hosts. Two careful papers by Dr. Warnecke will attract the attention of British lepidopterists. In one the discontinuous postglacial distributions of a number of European Macro-Lepidoptera are discussed, e.g., *Erebia epiphron, Rhyacia alpicola, Larentia cognata, L. taeniata, L. otregiata, L. ruberata* and others; and the second draws attention to certain peculiarities of the migrations recorded in 1952. For those of an historical bent there is an interesting contribution by Dr. Strouhal entitled 'Entomology in Austria since 1945', but containing in fact much biographical information on Austrian entomologists generally. Little else of interest or value to British entomologists is to be found elsewhere in this rather expensive volume.

N.D.R.

Woodworm, its biology and extermination, by Dr. N. E. Hickin, Ph.D., B.Sc., F.R.E.S., 1954, pp. 84, 89 figures. Published by the author and distributed by Simpkin Marshall, London. Price 10s. 6d.

Although primarily written for professions and trades directly connected with the storage and repair of timber—the timber trade in general, the householder and entomologist will find this work of the greatest interest.

Hitherto the literature has mainly consisted of scattered leaflets issued by the Department of Scientific Research and the British

Museum—here in one volume based on a series of articles appearing in the *Cabinet Maker*, the subject is fully discussed and the most up-to-date methods of prevention and control described.

The first chapter describes the various agents and factors causing the decay or destruction of timber, relative importance of various species of wood-boring beetles and notes on the scientific names of insects. It is considered that in the United Kingdom about 80 per cent of the total woodworm damage is caused by the Common Furniture Beetle (*Anobium punctatum*), 8 per cent by both the Death Watch and Lyctus, 1 per cent by the House Longhorn (*Hylotrupes bajulus*), the remaining 3 per cent being shared by some three hundred species. Succeeding chapters are devoted to descriptions of the most important species of Coleoptera damaging woodwork, their life-histories, predators and parasites. The prevention and control of infested timber is dealt with and the use of pinhole-bored timber.

One chapter is specifically devoted to control measures, the extermination from furniture and musical instruments. As the author is Technical Director of Rentokil Ltd., and Woodworm and Dry Rot Control Ltd., the information can be relied upon as being both effective and practical. Marine borers such as the *teredo* and Gribble (*Limnoria lignorum*) are dealt with, also an outline of the biology and control of termites. One chapter is devoted to insects commonly confused with woodworm; these include species of Ptinidae, Dermestidae, etc., which are described and control measures given. Finally a cross section of interesting works and papers on woodworm are listed.

Few printer's errors are evident, 'lania' for 'larva' on p. 51 being the most obvious. This book with its profuse and excellent illustrations, authoritative yet simply explained descriptions, will be of the utmost value to the layman and a welcome addition to the library of the entomologist. A.E.G.

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